MONTHLY WEATHER REVIEW.

Editor: Prof. Cleveland Abbe. Assistant Editor: Frank Owen Stetson.

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INTRODUCTION.

The Monthly Weather Review for November, 1905, is based on data from about 3470 stations, classified as follows:

Weather Bureau stations, regular, telegraph, and mail, 176; West Indian Service, cable and mail, 13; River and Flood Service, regular 52, special river and rainfall, 363, special rainfall only, 98; cooperative observers, domestic and foreign, 2565; total Weather Bureau Service, 3267; Canadian Meteorological Service, by telegraph and mail, 33; Meteorological Service of the Azores, by cable, 2; Meteorological Office, London, by cable, 8; Mexican Telegraph Company, by cable, 3; Army Post Hospital reports, 18; United States Life-Saving Service, 9; Jamaica Weather Service, 130.

Since December, 1904, the Weather Bureau has received an average of about 1700 reports from as many observers and vessels, giving international simultaneous observations over the Atlantic and Pacific oceans at 12 noon, Greenwich time, or 7 a. m., seventy-fifth meridian time. These are charted, and, with the corresponding land observations, will form the framework for daily weather charts of the globe.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. S.I. Kimball, General Superintendent of the United States Life-Saving Service; Capt. H. M. Hodges, U. S. N. (Retired), Hydrographer, United States Navy; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Secretary, Meteorological Office, London; H. H. Cousins, Chemist, in charge of the Jamaica Weather Office; Señor Enrique A. Del Monte, Director of the Meteorological Service of the Republic of Cuba; Rev. L. Gangoiti, Director of the Meteorological Observatory of Belen College, Havana, Cuba.

Attention is called to the fact that at regular Weather Bureau stations all data intended for the Central Office at Washington are recorded on seventy-fifth meridian or eastern standard time, except that hourly records of wind velocity and direction, temperature, and sunshine are entered on the respective local standards of time. As far as practicable, only the seventy-fifth meridian standard of time, which is exactly five hours behind Greenwich time, is used in the text of the Review. The standards used by the public in the United States and Canada and by the cooperative observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is 157° 30′, or $10^h\ 30^m$ west of Greenwich. The Costa Rican standard meridian is that of San José, $5^h\ 36^m$ west of Greenwich.

Barometric pressures, whether "station pressures" or "sea-level pressures", are now reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

In conformity with Instructions No. 43, March 29, 1905, the designation "voluntary", as applied to the class of observers performing services under the direction of the Weather Bureau without a stated compensation in money, is discontinued, and the designation "cooperative", will be used instead in all official publications and correspondence.

Hereafter the titles of the respective forecast districts will be as used in the current Review to accord with paragraph 236 of Station Regulations, dated June 15, 1905.

FORECASTS AND WARNINGS.

By Prof. E. B. Garriott, in charge of Forecast Division.

The first important storm of the month over the eastern Atlantic crossed the British Isles during the 11th and 12th. From the 17th to 20th a storm advanced from the ocean west of Portugal northeastward over France. The third decade of November was stormy on the British coasts and the North Sea, and during the 26th a severe gale prevailed over the English Channel. In the region about the Azores the month was quiet, and the storms that reached the western Atlantic from the American Continent were of moderate intensity.

In the United States a larger proportion of the storms first appeared over the British Northwest Territory, and in several instances they were traced from British Columbia. The severer storms, however, advanced from the Middle West and Southwest over the Great Lakes, where their frequency and intensity made November, 1905, a notably disastrous month. The severer storms of this month attended the passage over the Great Lakes on the 24th of low area XVI–XVII and on the 28th of low area XX. Low areas XIII and XV caused heavy gales on the north Pacific coast on the 17th and 18th, and the rains that attended these depressions ended the dry season in California. Ample and timely advices and warnings regarding the gales were issued to Lake, Gulf, and seacoast ports.

The first important cold wave of the season swept from the British Northwest Territory to the Atlantic coast from the 26th to 30th, with snow in the Northwestern States, a minimum temperature of —24° at Havre, Mont., zero temperature as far south as central Nebraska, freezing weather in the interior of the Gulf States, and a fall in temperature of 20° to 40° in the Atlantic coast States north of Florida. Timely advices were issued in connection with this cold wave.

BOSTON FORECAST DISTRICT.

The chief storm of the month was that of the 28–29th, during which gales of great force prevailed along the southern coast, delaying and inconveniencing shipping generally. During this storm the schooner *Charles E. Sears* of Calais, Me., was wrecked off Chatham, Mass., on November 30. Warnings were issued and signals displayed well in advance of the storm. Storm warnings were also issued on the 1st, 6th, 13th, 15th, 17th, and 24th for storms of more or less violence that passed over or in the vicinity of this territory. A cold-

wave warning was issued on the 29th, which was fully justified. A cold wave passed over this section on the 13–14th for which no warnings were issued, although the forecasts announced "colder weather" for all sections of the district. There were no gales along the coast for which warnings were not issued.—*J. W. Smith, District Forecaster.*

CHICAGO FORECAST DISTRICT.

Several energetic storms crossed the Great Lakes, the severest of which reached the Lakes on the 28th, causing an unusually large number of wrecks. Wrecks also occurred during previous storms of the month. Warnings were issued well in advance of the gales.

From the 27th to 29th a cold wave overspread the entire district. Timely advices were issued of the approaching cold, and on the 27th forecasts of heavy snow were made for the Dakotas, Minnesota, and Montana.—*H. J. Cox, Professor and District Forecaster.*

LOUISVILLE FORECAST DISTRICT.

Six general disturbances materially affected the weather conditions of this district, of which two caused severe storms on the 23d, 24th, 28th, and 29th, the latter being followed by the first cold wave of the season.—*F. J. Walz, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.

Storm warnings were issued for the west Gulf coast on the 29th, and high winds occurred at many points.

Frost warnings were issued twice in the first decade of the month for Arkansas and northern Louisiana, and frosts occurred in each instance over a great portion of the territory indicated. Warnings for freezing temperatures were issued on the 28th for Oklahoma and the Texas panhandle, and cold-wave warnings were ordered on the 29th for Arkansas, northern Louisiana, and the interior of Texas, the warnings in each case being verified.

In commenting on the cold weather and the warnings issued in connection therewith, the Daily States, of November 30, 1905, says:

> The forecasts and warnings of the United States Weather Bureau service in connection with this cold weather have been exceptionally accurate, both as to the intensity of the cold and the time of its occurrence. The money value of such a warning service is beyond computation.

I. M. Cline, District Forecaster.

DENVER FORECAST DISTRICT.

The most important weather changes of the month occurred in connection with a disturbance that crossed the district on the 27th and 28th, and timely warnings were issued for the cold wave that followed the disturbance.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.

The first half of the month was abnormally dry and during the last half several barometric depressions were attended by general rains.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND FORECAST DISTRICT.

There were two stormy periods, one from the 17th to 20th, and the other from the 25th to 30th, the heaviest winds occurring on the 17th. Warnings were issued on the 27th for the cold wave that overspread the district on the 28th.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

The only floods of the month occurred in the Gila, Salt, and lower Colorado rivers in southern Arizona. No river and flood service is maintained in this section, and no detailed reports of the floods have been received. From press reports, however, it has been learned that the floods were the greatest since 1891, when the southern portion of the city of Phoenix was inundated by flood waters from the Salt River. The floods were caused by the heavy rains and snows that fell over Arizona on November 26 and 27. The rains had been preceded by heavy snows in the Verde and Salt watersheds, and these snows, melted by the warm rains, were doubtless the principal factors in the flood formation. It was reported that the Arizona dam near Phoenix was greatly damaged, as were also numerous irrigation works, and several bridges were either badly injured or carried entirely away.

The lower Colorado River was also in flood a day or two later, and in the vicinity of Yuma was higher than any time since 1891 when the floods were somewhat more severe throughout the Colorado watershed. The only damage done at Yuma was the flooding of the electric lighting plant, the levees having been kept intact by a vigilant patrol. The Imperial Irrigation Works was reported as practically destroyed, and hope of diverting the river back to its old channel was abandoned.

There was somewhat less ice during the month than during the corresponding period of the previous year. Slush ice first appeared in the Missouri River at Bismarck, N. Dak., on the 1st, but the river did not freeze over until the 28th when navigation was suspended. In the lower river slush ice was running as far as Omaha, Nebr., on the 30th.

No ice of consequence was observed in the Mississippi River south of Minnesota, although it was quite heavy on the 26th and 27th at Reeds Landing, Minn.

The highest and lowest water, mean stage, and monthly range at 273 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*

CLIMATE AND CROP SERVICE.

By Mr. JAMES BERRY, Chief of Climate and Crop Division.

The following summaries relating to the general weather and crop conditions during November are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau; they are based upon reports from cooperative observers and crop correspondents, of whom there are about 3300 and 14,000, respectively:

Alabama.—Generally dry, mild, and favorable for work. Many warm days, but several moderately cold periods. Temperature reached 20° in northern counties on the 29th and 30th. Gathering of cotton and corn practically completed by the 20th, though a little cotton was still outstanding in scattered localities at close of month. Corn and minor crops made satisfactory yields, though quality of corn was inferior in many localities. Fall plowing and seeding progressed slowly. Early sown wheat and oats made good stands.—*F. P. Chaffee.*

Arizona.—The average temperature for the Territory was 1° below the normal; the average precipitation 3.99 inches in excess. Killing frost on the 28th, 29th, and 30th damaged gardens. Floods in the Salt and Gila rivers washed farm lands and roadways and carried away bridges. Much wheat and barley were sown; early planted growing well. Seventh and last cutting of alfalfa completed. Oranges, grape fruit, and dates yielding largely. Ranges much improved by new growth of grass. Stock in excellent condition. Water supply plentiful.—*L. N. Jesunofsky.*

Arkansas.—The month was generally favorable for farm work and the growth of late crops. Plowing for spring crops was delayed in some localities by the wet condition of the ground. Cotton picking was about completed, and the crop secured in fair condition. Wheat, oats, and rye were up to good stands. Irish and sweet potatoes made good yields. Fruit buds were too far advanced.—*C. M. Strong.*

California.—The heavy rainfall in southern California at the beginning of the month, and throughout the greater part of the State from the 26th to the 30th, caused a marked improvement in farming conditions generally. The seasonal rainfall was still far below average except in the south, but in most places the precipitation had been sufficient to soften the soil and start pasturage. The snowfall in the mountains was quite

heavy for the period. Severe frosts and high winds during the month caused but little damage.—*Alexander G. McAdie.*

Colorado.—The weather conditions were generally favorable to grass, farming operations, and the gathering of outstanding crops. Ranges were in good condition and stock water was adequate. The condition of cattle, horses, and sheep was generally good.—*Fred. H. Brandenburg.*

Florida.—The month gave nearly the normal amount of warmth. There was a deficiency in precipitation exceeding an inch. The month was one of the driest in the history of the section, being surpassed only in 1892, 1899, and 1901. The dry weather proved rather disastrous to vegetables on highlands. Much replanting and transplanting were necessary. The absence of rain was favorable for cane grinding and the harvesting of citrus fruits. Oats and rye did very well, although the lack of rain was seriously felt.—*A. J. Mitchell.*

Georgia.—The temperature was above and the rainfall below normal for the month, furnishing conditions favorable to the harvesting of crops, which work was practically completed. Minor crops showed satisfactory yields generally. Fall plowing was retarded in scattered districts by dry weather. The seeding of small grains progressed rapidly, as a rule, the seed germinating and growing nicely; acreage increased in some sections. Freezing temperatures extended well into the southern section.—*J. B. Marbury.*

Hawaii.—See addendum.

Idaho.—The month was the brightest November on record for Idaho, sunshine over a large part of the State having been almost uninterrupted by cloudiness during the first half of the month. Later in the month the weather became unsettled, and the month closed with stormy weather in all sections and heavy snow in the mountains. Some sheep were caught in the open range by the snow, but most wool growers were well prepared for rough weather.—*Edward L. Wells.*

Illinois.—Weather conditions were exceptionally favorable for farming operations, except in the southern district, where too much precipitation interfered with work. Wheat maintained a fine condition. The plant at the end of the month had attained good growth, was showing a good stand, had stooled well, and was altogether vigorous and healthy. In the central and northern districts the corn crop was mostly gathered during the month, with generally satisfactory results. Apples were very disappointing.—*Wm. G. Burns.*

Indiana.—Wet ground in some southern counties retarded corn husking and wheat seeding and probably caused a decreased acreage of wheat. Ungathered corn was down and damaged in some localities, but the greater portion of the crop had been cribbed in good condition or marketed. Old clover appeared dead in most fields and the stand of young clover was doubtful. Wheat and rye, generally, were in excellent condition. Hog cholera was prevalent in several localities.—*W. T. Blythe.*

Iowa.—The month was unusually favorable for harvesting the heavy corn crop, as there were sixteen clear days and only five on which rain fell. Probably over 80 per cent of the corn was cribbed in excellent condition before the close of the month; pasturage was very good, and there was sufficient moisture for healthy condition of fall wheat and rye; acreage of wheat much increased.—*John R. Sage.*

Kansas.—At the close of the month wheat presented a good stand, had a good color, and was growing well; in some of the northwestern counties wheat was still being sown. Corn husking was generally well advanced, though delayed more or less by the rains. The range in the western part of the state was generally good. Cattle were doing well.—*T. B. Jennings.*

Kentucky.—Month cool at opening, with moderate temperatures following. Another cool spell occurred about the 15th. Heavy rain occurred about 28th and 29th, followed by a cold wave on the 30th. Excepting the last two days, the month was favorable, with early sown wheat splendid and late sown coming up nicely. Fall rye and grass fine. Feed abundant and stock looking well. Corn mostly gathered and much husked. Fine potato crop, but tubers not keeping well.—*F. J. Walz.*

Louisiana.—Heavy rains over the southern and western portions of the State interfered to some extent with agricultural interests. Preparations for spring crops progressed slowly, except in scattered localities, where work was pushed vigorously. Sugar cane harvest progressed slowly and was backward; the tonnage was generally heavy, but the sugar yield was irregular. Rice thrashing, corn gathering, and cotton picking were about completed.—*I. M. Cline.*

Maryland and Delaware.—November was unusually dry, though the drought was relieved somewhat by rain at the close of the month. The temperature was seasonable. Fall work neared completion. Early sown grains and grasses did fairly well, but those put in late were starting poorly. Pastures failed extensively, but there was an abundance of silage and fodder. Final harvesting operations were nearly finished.—*C. F. von Herrmann.*

Michigan.—The month of November in the principal agricultural counties of the State was slightly cooler and drier than the normal. These conditions were generally very favorable for securing late fall crops. At the close of the month a large per cent of corn was husked and most of the sugar beets delivered to the factories. Winter wheat and rye made good growth, but considerable Hessian fly was reported in the early seeding of wheat.—*C. F. Schneider.*

Minnesota.—The mean temperature was everywhere above normal; the precipitation was also above normal, with heavy rains on the 4th and 24th, and heavy snow on the 27th. Very fine weather from the 9th to the 22d. No cold weather until late in the month, and lakes not frozen until the 30th. Plowing, thrashing, and corn husking well advanced. Some Red River Valley wheat, abandoned because of high water at harvest time, was being cut during November.—*T. S. Outram.*

Mississippi.—Notwithstanding some heavy rains during the first decade, the weather was generally favorable for gathering crops. From the 14th to the 29th unusually warm weather prevailed, but on the 30th a cold wave swept over the State, giving freezing temperature almost to the coast. Cotton picking was practically completed, except in the western counties, where about one-tenth of the crop was unpicked at the close of the month. Corn was all housed. Very little fall seeding, but considerable plowing was done. Gardens did well south.—*W. S. Belden.*

Missouri.—The month of November was generally favorable for outdoor work on the farm and for the growth of wheat. The wheat crop was highly satisfactory at the close of the month as to stand, color, and growth. Corn gathering progressed favorably; about one-fourth of the crop was still in the fields, but was in shock and in good condition; the yield was satisfactory. Winter pastures continued in good condition and stock water was plentiful.—*George Reeder.*

Montana.—The month was mild and dry until the 23d. Light to heavy snows fell throughout the State the remainder of the month, with several days of intense cold. Range feed plentiful till covered by snow, and little feeding was necessary. Cattle, sheep, and horses were mostly strong and in good flesh, and were not seriously affected by the inclement weather. Too dry in some localities for fall wheat to germinate; most of the crop came up well, and was in excellent condition.—*R. F. Young.*

Nebraska.—November was warm and wet, unusually favorable for the growth of grass and fall sown grain. Pastures were good throughout the month and stock generally was in prime condition. Winter wheat made an excellent growth and was in fine condition, the early sown fields being rather the best. Corn husking was delayed by wet weather, but generally rather more than half the crop was gathered in November. The yield was less than expected.—*G. A. Loveland.*

Nevada.—The average temperature for November was 3.1° below normal, and the average precipitation was 0.32 inch above normal. The first half of the month was dry, but the drought was broken on the 19th, when rain or snow occurred; the remainder of the month was generally stormy, with heavy snows in the mountains. The precipitation greatly benefited wheat, oats, barley, and range grasses. Stock was generally in fair condition and large numbers were gathered to the ranches for winter feeding.—*H. F. Alps.*

New England.—The weather of the month was exceptionally pleasant, there being an unusually large percentage of sunshine and but few stormy days. The precipitation, while light, was well distributed, except some large amounts at points in Maine. The small rainfall of autumn left the ground very dry, and copious rains were much needed. Fall work and farming operations of all kinds made good grogress, the prevailing fair weather having been very favorable for all outdoor pursuits.—*J. W. Smith.*

New Jersey.—Exceptionally fine weather prevailed to the 28th. Farm work was well advanced. Wheat, rye, and grass were in fairly good condition, but in places the stands were impaired by drought and the crops were not sufficiently well rooted to withstand winter's freezing and thawing. Wheat sown late in October in the southern section was not yet above ground. Springs and streams were low, some dry. Copious rains at the close of the month effectually broke the long drought in northern and central sections.—*Edward W. McGann.*

New Mexico.—Exceedingly heavy rains fell in the valleys and over the mesa lands, and unusually deep snow in the mountain districts. The warm rains of the 26th and 27th melted the snow on the mountains in the southwest portion and caused a damaging flood along the Gila River. The weather was favorable to stock, except in some sections of the north, where the cold spell at close of month caused some shrinkage. The ranges were in good condition and grass plentiful. High winds were frequent and protracted.—*J. B. Sloan.*

New York.—November was a fine fall month, with generally mild temperature. The precipitation was generally light until the last three days of the month, when a fairly good amount of rain or snow fell in all portions of the State. The fall work was practically completed. Winter wheat and rye continued in fine condition and fall pastures held out unusually well. Stock was reported to be in good condition for the winter.—*H. B. Hersey.*

North Carolina.—The mean temperature for the State was slightly above normal, but the precipitation was 2.48 inches below normal. The weather was very favorable for outside work, but too dry for the proper germination and growth of winter grains. On account of the droughty conditions a great deal of winter wheat was sown late and a large acreage remained to be sown, especially in the central district. Early sown wheat looked vigorous. Rye and oats were doing well.—*A. H. Thiessen.*

North Dakota.—The month was quite warm and pleasant, until the latter part, when a severe snow and wind storm prevailed, accompanied by a moderate cold wave. Considerable fall plowing was done, especially in the northern and eastern portions. Stock on the ranges did very well.

SUMMARY OF TEMPERATURE AND PRECIPITATION BY SECTIONS, NOVEMBER, 1905.

In the following table are given, for the various sections of the Climate and Crop Service of the Weather Bureau, the average temperature and rainfall, the stations reporting the highest and lowest temperatures with dates of occurrence, the stations reporting greatest and least monthly precipitation, and other data, as indicated by the several headings.

The mean temperatures for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperature and precipitation are based only on records from stations that have ten or more years of observation. Of course the number of such records is smaller than the total number of stations.

Section.	Temperature—in degrees Fahrenheit.								Precipitation—in inches and hundredths.					
	Section average.	Departure from the normal.	Monthly extremes.						Section average.	Departure from the normal.	Greatest monthly.		Least monthly.	
			Station.	Highest.	Date.	Station.	Lowest.	Date.			Station.	Amount.	Station.	Amount.
Alabama	55.8	+ 2.4	3 stations	88	3 dates	Riverton Delmar, Valley Head	20 20	29 30	1.78	−1.38	Spring Hill	4.64	Thomasville	0.55
Arizona	52.7	− 1.0	2 stations	92	1, 2	Flagstaff	− 8	29	5.22	+3.99	Huachua Reservoir.	14.25	Upper San Pedro	1.75
Arkansas	53.2	+ 2.1	Pocahontas	88	18	Oregon	9	30	3.28	−0.30	Marked Tree	6.23	La Crosse	0.88
California	52.0	− 0.8	Craftonville	96	2	Bodie	− 9	26	2.26	−0.51	Cuyamaca	10.15	Mammoth Tank	T.
Colorado	37.4	+ 2.4	Lamar Holly	82 82	14 15	Wagon Wheel Gap	−27	29	0.77	+0.09	Silverton	5.81	Fort Morgan	T.
Florida	66.0	+ 0.7	Flamingo	91	7	Molino	31	12	0.91	−1.26	Miami	3.65	3 stations	0.00
Georgia	56.5	+ 1.4	Fleming	90	6	Diamond	18	23	1.69	−1.13	Montezuma	2.63	Valdosta	0.25
Hawaii	†71.9	......	Kohala Mission	91	21, 23	Humuula	41	5 dates	‡10.28	......	Hakalau (Mauka)	46.18	Kihei, Maui	0.02
Idaho	35.6	......	Glenns Ferry	84	3	Lake	−12	21	1.46	......	2 stations	3.50	Garnet	0.31
Illinois	42.2	+ 1.4	Carrollton, Chester	79	28	Zion	4	30	2.14	−0.48	Raum	4.34	Philo	1.01
Indiana	41.7	+ 0.4	Veedersburg	78	28	Logansport	12	15	2.68	−0.94	Rome	5.53	Valparaiso	1.15
Iowa	38.4	+ 3.2	4 stations	70	4 dates	Estherville	−12	30	2.84	+1.53	Plover	5.30	Mount Vernon	0.90
Kansas	45.9	+ 3.1	Cunningham	81	13	Harrison	4	30	2.41	−1.38	Chapman	4.05	Oberlin	0.65
Kentucky	46.4	+ 0.6	Cadiz	79	18	Owenton	14	30	3.55	−0.25	Marion	6.44	Williamsburg	1.30
Louisiana	61.6	+ 3.6	Franklin Schriever	87 87	5 5, 27	Calhoun, Ruston	26	30	4.88	+1.17	Grand Coteau	9.67	Shreveport	2.93
Maryland and Delaware.	43.3	− 0.8	College Park, Md	77	25	Deer Park, Md	10	15	1.28	−1.57	Oakland, Md	3.40	Westernport, Md	0.16
Michigan	35.1	− 0.4	Charlotte	74	28	Detour	−16	30	2.19	−0.21	Hagar	4.61	St. James	0.69
Minnesota	33.1	+ 4.3	Redwing	71	12	Wadena	−35	30	2.64	+1.52	New Richland	4.63	Reeds Landing	0.96
Mississippi	57.3	+ 2.8	Leakesville	86	19	Ripley	17	30	3.20	−0.12	Woodville	7.34	Okolona	0.90
Missouri	45.8	+ 2.6	Decaturville	83	28	Unionville	2	30	1.94	−0.29	Fairport	3.58	Decaturville	0.65
Montana	33.3	+ 2.1	Lewistown	81	13	Fort Logan	−33	28	1.02	−0.05	Marysville	3.70	Fallon	0.05
Nebraska	40.4	+ 4.2	Grant	81	14	Halsey	−17	29	1.53	+0.89	Wisner	4.15	Kimball	T.
Nevada	36.4	− 3.1	Fenelon	88	14	Potts	−10	29	1.11	+0.32	Morey	2.88	2 stations	0.10
New England*	36.2	− 2.4	Madison, Me	69	2	Enosburg Falls, Vt	− 6	14	2.60	−1.58	Bar Harbor, Me	7.22	Norfolk, Mass	1.30
New Jersey	42.1	− 1.3	Toms River Cape May C. H	70 70	24 24	Charlotteburg	6	15	1.84	−1.87	Newton	2.86	Cape May	0.54
New Mexico	44.0	+ 1.4	Albert, Carlsbad	80	7	Tres Piedras	− 6	29	3.05	+2.56	Luna	6.01	Artesia	1.31
New York	35.6	− 1.5	Oyster Bay	77	2	Indian Lake North Lake	−10 −10	30 3 d't's	2.19	−0.80	Ripley	5.40	Romulus	0.45
North Carolina	49.9	+ 0.2	Pinehurst	81	29	Pink Beds	5	22	0.72	−2.48	Murphy	2.60	2 stations	0.00
North Dakota	31.6	+ 8.6	Medora	88	16	Walhalla	−38	30	1.54	+0.66	Hamilton	3.06	Williston	0.31
Ohio	39.6	− 1.4	Chillicothe Ironton	71 71	24 18	Green Hill Millport	10 10	14 14	2.63	−0.50	Green	4.34	Bellefontaine	1.47
Oklahoma and Indian Territories.	51.9	+ 2.5	Fort Sill, Okla	86	1	Vinita, Ind. T	9	30	2.59	+0.30	Harrington, Okla	5.29	Meeker, Okla	0.30
Oregon	41.4	− 1.8	Fairview	81	11	Richland	3	18	2.98	−3.81	Orseco	9.13	Warmspring	0.17
Pennsylvania	39.1	− 1.1	Irwin Philadelphia (c)	68 68	29 6	Pocono Lake	5	14	2.47	−0.77	Brookville	3.72	Dushore	1.08
Porto Rico	77.6	......	Central Aguirre	98	7	Adjuntas	53	20	7.41	......	Lares	14.66	Ponce	2.90
South Carolina	54.5	+ 1.4	Gaffney	90	26	Greenville Seivern	21 21	23, 24 22	1.31	−1.53	Liberty	2.41	St. George	0.00
South Dakota	37.1	+ 6.0	Armour, Mellette	76	16	Ipswich	−27	30	1.60	+1.09	Elk Point	3.90	Pine Ridge	0.30
Tennessee	49.6	+ 1.7	Dover	80	18	Hohenwald	17	30	1.94	−1.84	Trenton	5.47	Jonesboro	0.23
Texas	59.6	+ 2.7	Fort Ringgold	96	5, 19	Texline	14	30	3.62	+1.15	Danevang	10.60	Llano	0.05
Utah	37.9	− 0.3	Green River	79	26	Henefer	−11	29	1.53	+0.43	Tropic	4.97	Lucin	0.10
Virginia	46.5	− 1.2	Saxe	79	18	Dinwiddie	8	10	0.78	−1.71	Speers Ferry	1.90	Quantico	T.
Washington	40.1	− 0.2	Kosmos	74	8	Cusick	− 5	28	2.38	−2.94	Clearwater	9.30	Sunnyside	0.22
West Virginia	41.8	− 0.9	Moorefield	74	28	Bayard	10	21	2.44	− 0.60	Cairo	5.67	Elkhorn	0.67
Wisconsin	34.4	+ 2.8	Ashland	67	11	Grantsburg	−24	30	2.04	+0.52	Mount Horeb	3.25	Medford	0.65
Wyoming	32.5	+ 0.9	Pine Bluff	74	14, 16	Griggs	−26	29	0.60	+0.05	Fort Washakie	2.34	2 stations	T.

* Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. † 47 Stations with an average elevation of 680 feet. ‡ 140 Stations.

Prairie fires during the month destroyed considerable grass on the ranges.—*B. H. Bronson.*

Ohio.—The weather was generally favorable for farm work and crops. Corn husking was well advanced and prospects were generally excellent. Winter wheat made splendid growth and the condition was unusually good. Rye was also reported to be in good condition, although there were a few reports of damage by fly to both wheat and rye. Pastures and meadows were in good condition. *J. Warren Smith.*

Oklahoma and Indian Territories.—A warm month, with ample moisture. Fall plowing and seeding progressed well. Wheat did well. Late planted attained a good stand; early planted was making good growth, some stooling, some being pastured. Corn being cribbed in good condition, with fair to good yields. Cotton picking completed in some sections and about 75 per cent gathered in others; the quality was good. Good crops of kaffir corn, millet, sorghum, alfalfa, and hay were secured. Sweet potatoes were a good crop. Irish potatoes fair. Pastures good; stock doing well.—*Edward B. Richards.*

Oregon.—The month was very favorable for farm work; sufficient rain fell to put the soil in excellent condition for plowing and seeding, and a large acreage of wheat land was seeded. Wheat sown the latter part of October and the early part of November came up quickly and looked thrifty and promising, while that sown later germinated slowly, owing to cool weather and frosty nights. The growth of grass was also checked during the last decade, and stock began losing flesh and required extra feeding.—*A. B. Wollaber.*

Pennsylvania.—Soil in good condition. Farm work well advanced. Winter grain well set and thrifty; a few reports of fly. Streams, springs, and wells were filled by the copious rains of the 28th and 29th, relieving the danger of water famine.—*T. F. Townsend.*

Porto Rico.—Rainfall generally light until near the close of the month, when heavy to excessive showers occurred in all sections. Cane did well generally and a large sugar crop seemed assured; the crop arrowed freely in the northern districts; in the south considerable cane was matured and ready for the December grinding. Coffee picking continued in the highlands. There was a great increase in the acreage of tobacco sown this year and planting continued active; the crop was in good condition at the close of the month. Much of the cotton crop was destroyed by worms. Oranges were plentiful; small crops somewhat scarce.—*E. C. Thompson.*

South Carolina.—The month was warmer than usual; there were frequent frosts, but crops were beyond damage. There was less than the usual amount of precipitation, which caused a scarcity of water in some localities. The drought also interfered somewhat with oat and wheat seeding, which was not finished. Early sown wheat and oats germi-

nated favorably and came up to good stands. Harvesting operations were finished. Truck suffered for rain, but was nevertheless in fair condition.—*J. W. Bauer.*

South Dakota.—Month warmer and wetter than usual. Rain and snow retarded cribbing of corn, and considerable corn was yet in fields on the 30th. Some corn showed slight damage by worms. Winter grains and also live stock were in fine condition. Weather was favorable for free grazing of stock on ranges, except during the last four days of the month, when there was a rain and snow storm followed by low temperatures, and from six to twelve inches of snowfall over the northern counties. Considerable plowing was done.—*S. W. Glenn.*

Tennessee.—The precipitation was light until the 28th and 29th, when good rains fell generally over the State, with heavy amounts in the northwest portion. The rainfall was sufficient for the needs of winter grains, and temperature and sunshine conditions were also favorable, so that wheat and oats were in fine condition. Corn, cotton, and peanuts were nearly all gathered by the close of the month, and farm work was well advanced.—*Roscoe Nunn.*

Texas.—Moderate temperatures prevailed during November, and there was little damage by frost. Good showers were well distributed throughout the month. Seeding winter grain was somewhat delayed, but conditions were favorable for germination and growth. Cotton picking delayed; 10 to 20 per cent to be picked northeast, but mostly picked farther south; boll weevil numerous; cattle turned into some fields. Rice thrashing almost completed. Cutting and grinding of cane in progress. Pastures and conditions for truck gardening improved. Cattle doing well.—*M. E. Blystone.*

Utah.—Warm, pleasant weather prevailed during the first two decades, followed by a stormy period near the close of the month, during which several inches of snow fell. Farm work advanced rapidly, and the sowing of wheat and rye was practically completed; an increase was reported in the acreage sown to winter wheat. Considerable plowing for spring grain was done. The gathering of beets and potatoes was completed. The range was good, though generally covered with snow. Stock was thriving.—*L. Lodholz.*

Virginia.—The cold and dry weather of the month in middle and tidewater Virginia was not favorable for crops, and, except locally, germination of late seeding of wheat, oats, and clover was much retarded, and the stands secured were not as good as usual. Growth of early seeding was also checked. In the great valley division, where the quantity of precipitation was greater than elsewhere in the State, and the distribution quite uniform, crop progress, both of early and late seeding, was better and the general situation was more advanced at the close of the month.—*Edward A. Evans.*

Washington.—Absence of rainy weather afforded opportunity to complete winter wheat sowing and fall plowing. Month was too cool and frosty for rapid germination or growth of wheat, but the crop was in fair condition and well covered by snow at the end of the month. The dry weather of the fore part of the month was unfavorable for pastures, but very favorable for gathering root crops and late apples.—*G. N. Salisbury.*

West Virginia.—Fine weather prevailed during the month and farm work progressed nicely. Wheat and rye made good growth and were looking well. A large acreage of wheat was sown. Pastures were in fairly good condition, and but little feeding was done. Stock was in good condition. Corn husking was nearing completion. Meadows and clover were in excellent condition. Some plowing was done for next year's crops.—*E. C. Vose.*

Wisconsin.—The month was mainly pleasant and favorable for completion of farm work. Winter wheat, rye, and grasses were in healthy condition and the snowfall over the central and northern counties in advance of the cold wave of the 29th furnished ample protection. The soil was generally well stored with moisture. The storm of the 29th was accompanied with very high winds and some damage to fences and wind mills occurred.—*W. M. Wilson.*

Wyoming.—The mild and pleasant weather of the first 25 days of the month was extremely favorable for the stock throughout the State, and the storm of the closing days of the month was not severe enough to seriously affect any of the stock. Ranges provided good feed and stock remained in good condition. A good supply of snow was accumulating in the mountains.—*W. S. Palmer.*

SPECIAL ARTICLES.

THE IMPORTANCE OF A WELL WRITTEN SYNOPSIS OF WEATHER CONDITIONS.

By N. R. TAYLOR, Observer, Weather Bureau. Dated Springfield, Mo., November 29, 1905.

The various meteorological elements shown on a weather map furnish at all times ample material for an interesting résumé of the general weather conditions that prevail over the territory covered by the Canadian, Mexican, West Indian, and United States stations reporting to the Weather Bureau. The space allowed on the weather map for the synopsis of general conditions is often too limited to fully express the different effects caused by the varied movements of the atmosphere.

Those who receive the weather maps are not only interested in the predictions that appear thereon, but some also desire to know the prevailing weather in particular regions other than their own; some, who have learned the meaning of the areas of high and low pressure, test their ability to forecast for themselves; and some study the observer's notes with a view to learning what it is all about. To the latter class belong the teachers and scholars of the hundreds of schools where weather maps are used in the course of study. The daily press of the country also belongs to this class, for the newspaper of to-day that does not contain some item from the weather map is indeed obscure and unimportant. Many newspapers, especially those published in the afternoon, not only use the forecast and tabulated matter, but print conspicuously the entire notes of the observer. A well written synopsis is always welcome "copy" to the newspaper reporter, who sees to it that it receives a place in his paper commensurate with its importance.

No better way can be imagined of teaching the public at least some of the principles which are involved in making weather predictions than an intelligently written summary of meteorological conditions. By reading such a summary the student of the weather map easily calls up a mental picture of prevailing atmospheric conditions throughout the country without the aid of the map itself.

A satisfactory synopsis ought to state as succinctly as possible, and in simple, but well chosen words, the prevailing weather conditions over the entire country covered by the weather reports, and the changes that have taken place since the issue of the preceding map. It should not only make plain to the ordinary reader the reasons for any changes that have occurred, but should show what connection exists between the prevailing weather and the forecast. In fact, a key to the forecast should always be found in the synopsis.

Of the many meteorological elements that are taken into consideration in the construction of a weather map, the most prominent are pressure, temperature, precipitation, and winds; and these, it is thought, should usually be discussed in the order in which they have been named. Areas of high or low pressure, when considered of sufficient importance to be referred to at all, should be commented on from day to day, and their effects on the weather in the different localities over which they pass should be noted so long as they appear on the map. By adopting this rule it will be found that new interest in the map will be awakened, and persons who once saw no meaning in the isobaric lines will find themselves watching the drifts of the crests and troughs of the great atmospheric waves. Marked changes in temperature should not be passed unnoticed, and the section of the country in which such changes have occurred should be referred to either in a general way, as the eastern or western half of the country, the Rocky Mountain regions, etc., or specifically when they have resulted in a degree of heat or cold sufficiently severe to injure agricultural products in any locality, as a hot wave in Texas, or a freeze in California or Florida. Precipitation, whether of rain, sleet, hail, or snow, is always an important element, and a synopsis would be incomplete that omitted the fact of its occurrence or failed to mention the section of the country from which it was reported. High winds are also an important feature in discussing the general weather conditions; they are especially important when reported from maritime stations, and their significance will be more generally understood if referred to as "dangerous gales," "winds of destructive force," or some other popular expression. Areas of clear, partly cloudy, or cloudy weather, when they are well defined

and of sufficient magnitude to be conspicuous, should be made the subject of brief comment.

The following synopses will serve to illustrate what are thought to be satisfactory summaries of the meteorological conditions exhibited on two selected weather maps:

Weather map of 8 a. m., November 8, 1905.

Atmospheric conditions between the Mississippi River and the Rocky Mountains and in the extreme Northwest have remained practically inactive during the past 24 hours. A disturbance is developing over northern Mexico which is resulting in cloudy weather in southern California and Texas and rain in the vicinity of Los Angeles, Cal., and in the upper portion of the Rio Grande Valley. Rain has also fallen during the past 24 hours in the Ohio Valley, the Lake region, New York, and the New England States. No important temperature changes have occurred since yesterday. The weather conditions in the Southwest during the next 36 hours will be controlled by the Mexican disturbance, which will cause cloudy and unsettled weather in this vicinity, with probably showers to-night or Thursday. Higher temperature is indicated for to-night.

Weather map of 8 a. m., November 20, 1905.

A storm of marked intensity appears this morning over the middle Plateau regions, with a trough of low barometric pressure extending from the coast of southern California northeastward to Canada. Pressure has increased considerably over the northeast section of the country and has resulted in much colder weather in the Ohio Valley, the Lake regions, and the New England States. It is increasing rapidly over the north Pacific coast, with a steep barometric gradient, thence southeastward to the middle Plateau regions. Cloudy weather prevails this morning in the Southern States, and light rains have fallen during the past 24 hours in Missouri, southern Texas, California, southern Utah, and in portions of Georgia and Tennessee. Snow was falling this morning in Nevada. The Plateau disturbance will move eastward and will cause southerly winds and higher temperatures in this section during the next 36 hours, followed Tuesday by increasing cloudiness. Fair weather and moderate temperature are indicated for to-night.

RESULTS OF THE WORK DONE AT THE AERONAUTICAL OBSERVATORY OF THE ROYAL PRUSSIAN METEOROLOGICAL INSTITUTE, FROM JANUARY 1, 1903, TO DECEMBER 31, 1904.[1]

By Stanislav Hanzlik, Ph. D. Dated December 2, 1905.

Rapidly following the second volume (see Monthly Weather Review, December, 1904) appears the third and last publication of this aeronautical observatory as a department of the Royal Meteorological Institute. The observatory has now been separated and transferred as an independent institution, under the title Royal Aeronautical Observatory at Lindenberg, to Lindenberg, 65 kilometers (40.4 miles) southeast of Berlin, in the county of Beeskow-Storkow.

The above-named publication contains, in 188 pages, the results of soundings of the atmosphere during two years, from January 1, 1903, to December 31, 1904. In the first year were made 481, in the second 453 ascents; on every day of this period at least one ascent was made. For economical reasons and on account of the great accumulation of material the results are given in a very condensed form; for the ground, 40 meters (131 feet) above sea level, and 200 meters (656 feet), and 500 meters (1640 feet), and each succeeding 500 meters, and for the greatest height reached. The remarks are very copious. The results are given in extenso only for the days of international ascensions, which are made once a month.

The ascents of elastic rubber balloons were not quite successful in this period, partly because other duties occupied Professor Assmann, who had hitherto personally supervised the work with rubber balloons, and, second, on account of the poor quality of the material used for the rubber balloons. An improvement was made on the rubber balloons by arranging at the bottom of each a trap vent or valve suspended by a line hanging inside of the balloon from the top. When the balloon, filled with hydrogen, ascends and expands, the line stretches more and more till at a certain stage it opens the valve; then the expanded balloon loses enough gas to close the valve and the balloon falls to the ground with moderate velocity. The advantages of this arrangement are, that knowing how the diameter of the balloon increases with diminishing pressure, we can in advance—by the length of the line—fix the height to which the balloon has to ascend, and, second, the balloon comes down to the ground in most cases unharmed and can be used again. Professor Assmann plans to use this scheme every second day, if possible, at the new observatory in Lindenberg.

The table of the average and maximum heights reached in the years 1903 and 1904 shows the following figures:

	Average height.				Maximum height.			
	1903.	1904.	1903.	1904.	1903.	1904.	1903.	1904.
	m.	*m.*	*ft.*	*ft.*	*m.*	*m.*	*ft.*	*ft.*
Kite balloon.....	1,341	1,384	4,400	4,541	2,040	2,157	6,693	7,077
Kites..................	2,014	2,433	6,608	7,982	4,598	5,100	15,085	16,732

These figures show a great improvement in the skill of the operators. In 1903 and 1904 the kite balloons had to be used in 30 per cent and 39 per cent, respectively, of the cases of all ascensions, on account of poor wind conditions.

The observatory took part in the international ascensions with kites, sounding balloons, and manned balloons; the greatest height reached in 1903 was 8770 meters (28,773 feet) by Professors Berson and von Schrötter.

In connection with this high ascent some interesting remarks are published about the influence of the rarefied air at this height on both mind and body. The observatory took part in the German educational exhibit at St. Louis, in 1904, where it was awarded a grand prize, as has already been reported in the Monthly Weather Review.

The introduction to this third volume closes with a short paper by Professor Berson on the average and extreme temperature for each 500 meters and an index to all ascensions.

The new Royal Aeronautical Observatory at Lindenberg was opened on the 16th of October, 1905, in the presence of Emperor William II., and high officials, and scientists; among the foreign scientists, Mr. A. L. Rotch and the Prince of Monaco were present, and the latter was awarded the golden medal for science by the Emperor. The Prince of Monaco, assisted by Professor Hergesell, of Strassburg, has lately contributed much to the exploration of the higher strata of the air above the ocean.

[1] Ergebnisse der Arbeiten am Aëronautischen Observatorium, 1 Januar, 1903, bis 31 December, 1904. Von R. Assmann und A. Berson.

HIGHEST KITE ASCENSION.

By Prof. C. F. Marvin.

Dated Washington, D. C., December 18, 1905.

From a note in *Das Wetter* for November, 1905, p. 262, we learn that an extreme elevation of 6430 meters, or 21,096 feet; that is, almost exactly four miles, was attained at the German Aeronautical Observatory at Lindenberg, by means of a series of six kites. The record from automatic instruments sent up with the kites showed a drop in temperature from 40.8° F., at the ground to —13° at the highest point. The wind velocity in the lower strata was about 18 miles per hour, and at the highest elevation 56 miles per hour.

The Aeronautical Observatory under Doctor Assmann has been in operation only a few years, and yet has made wonderful progress in the meteorological exploration of the upper air by means of kites and balloons. A few years ago it seemed almost as if elevations of from two to two and a half miles were the limiting elevations for kite ascensions. The present accomplishment under Doctor Assmann is the more noteworthy from the fact that the kites were flown on land, where everything depends upon the natural wind. Hereto-

fore, several incredibly high ascensions have been made at sea from the deck of steam vessels at the command of Teisserenc de Bort. The ability to direct the speed and motion of the vessel to give the best conditions for the flight of the kites constitutes a decided advantage over ascensions made on land from stationary reels, etc.

In the German ascension the note states that six kites were employed having an aggregate area of 323 square feet, and that 47,572 feet of wire (about 9 miles) were suspended in the air.

The size or sizes of the wire employed, the form and structural details of the kites, and their dispositions on the line, together with data in regard to the average tension of the wire, all constitute important details of this distinct engineering achievement that would be highly interesting to aeronautical students. None of these are given in the note referred to, but it is hoped that they will appear in due time in the reports of the observatory.

THE RAINFALL OF CHINA AND KOREA.

By T. OKADA.

[Reprinted from the Journal of the Meteorological Society of Japan, Vol. 24, No. 9, September, 1905.]

[The east coast of Asia must have many climatal analogies with the east coast of North America, but our actual statistical knowledge of the subject has become possible only through the exertions of meteorologists during the past twenty years.

On account of the efforts made by the Department of Agriculture to introduce into the United States many of the important plants of China it becomes doubly necessary that we make a complete study of the climate, especially the rainfall and temperature of these two countries. We therefore have received with great pleasure an important article by T. Okada, published in the Journal of the Meteorological Society of Japan for September, 1905, vol. 24, No. 9, and reprint it herewith, with the addition of an outline map, on which we have entered the annual rainfall figures, but without drawing isohyetal lines, since the figures relate to special groups of years and have not yet been reduced to the fundamental interval, owing to the sparseness of the data. It will, however, be seen that we have here a good general idea of the rainfall along the immediate coast line between latitudes 20° and 40° north.—*C. A.*]

RAINFALL TABLES FOR CHINA AND KOREA.

I. *Introductory.*—Since the publication of Dr. Fritsche's admirable treatise on the climate of eastern Asia, contributions to the knowledge of the climate of China, especially in connection with the rainfall, have been made by several authorities, as Thirrling, Hann, Supan, and Doberck. Among others Professor Supan collected the results of pluviometric observations made at Chinese light-houses and custom-houses, together with those taken at the Peking, Zikawei, and Hongkong meteorological observatories, and published the result of his elaborate discussion in the well known Petermann's Geographische Mitteilungen. This monograph by the German geographer is indeed the most complete of all the similar works that we have at present. But since the publication of that memoir several years have elapsed, and we can now obtain a several years longer mean of rainfall at some forty stations in eastern China and the Korean Empire, instead of the six years' mean at a smaller number of stations from which Professor Supan has drawn his conclusions on the pluviometric conditions of the vast celestial empire. It may not, therefore, be needless duplication to publish here a collection of the more recent observations for the ten years from 1892 to 1901.

The materials used are the rainfall tables given in the successive volumes of the excellent bulletins of the Observatoire Magnétique et Météorologique de Zikawei for the years from 1892 to 1901. These tables contain only daily sums of precipitation at some thirty stations on the coasts of China and Korea, which include custom-houses, light-houses, and meteorlogical observatories. We have, therefore, enumerated the number of days with rain, and extracted the greatest daily rainfall for each month from the tables. The data for Tintau, Wei-hai-wei, and Foochow are taken from other sources. Rainfall tables for China, published by Doctor Doberck in the early numbers of the Quarterly Journal of the Meteorological Society, and reports of Hongkong Observatory were also consulted.

2. *Annual rainfall.*—We give in Table 1 the mean annual rainfall at thirty-seven stations in China and three stations in Korea. Most of these stations are situated on the coasts or on the neighboring islands, and only a few stations have continental situation, so that our data are professedly insufficient for the study of geographical distribution of rainfall throughout the empire. The mean annual rainfalls here given are mostly deduced from the ten years' observations, and only a few of them refer to measurements of shorter duratation. But we have abstained from reducing the latter to the corresponding 10-year mean as is usual in pluviometric investigations, simply because we have not sufficient data to do so.

TABLE 1.—*Annual rainfall.*

Stations.	Latitude.		Longitude.		Annual rainfall.
	°	′	°	′	*mm.*
Peking	39	57	116	28	675.9
Wonsan	39	9	127	33	1138.1
Houki	38	4	120	39	423.2
Chefoo	37	34	121	32	582.6
Chemulpo	37	29	126	37	905.2
Shangtung Cape, NE.	37	24	122	42	536.1
Shangtung Cape, SE.	37	24	122	42	671.9
Wei-Hai-Wei	37	10	122	10	535.5
Tintau	36	4	120	18	682.6
Fusan	35	5	129	6	1136.3
Chinkiang	32	12	119	30	1041.8
Shaweishan	31	25	122	15	984.5
Wuhu	31	22	118	22	1017.9
Zikawei	31	12	121	21	1009.7
North Saddle	30	52	122	40	746.7
Gutzluff	30	50	122	10	823.8
Hankau	30	33	114	20	1276.1
Ichang	30	12	111	19	1059.3
Steep Island	30	12	122	36	848.6
Ningpo	29	58	121	44	1375.3
Kiukiang	29	44	113	48	1326.4
Chunking	29	31	104	11	979.5
Wenchow	28	0	120	35	1501.1
Pagoda	26	8	119	38	1208.6
Middledog	25	58	120	2	1114.9
Tournabout	25	26	119	56	1001.5
Ockseu	24	59	119	28	886.9
Amoy	24	27	118	4	1073.0
Chapel Island	24	10	118	13	813.0
Wuchow	23	29	111	20	1111.5
Swatow	23	20	116	43	1460.6
Lamocks	23	15	117	18	1001.0
Canton	23	7	113	17	1292.5
Breakerpoint	22	56	116	28	1549.6
Longchow	22	22	106	45	1010.1
Hongkong	22	18	114	10	2005.0
Macao	22	11	113	33	1615.5
Waglan	22	10	113	30	1209.9
Pakhoi	21	29	109	6	1979.9
Kiungchow	20	3	110	20	1288.1

In northern China the amount of rainfall is generally below 100 centimeters, as in our Hokkaido (Japan). The provinces of Shangtung are peculiarly liable to drought, with consequent severe famine. But the valley of the Yangtsekiang and southern China are wet and fertile. In general, the annual rainfall decreases from the south to the north; thus Pakhoi, in the Gulf of Tonking, has 188 centimeters of rainfall; Foochow, 121 centimeters; Zikawei, 101 centimeters; Shangtung promontory, 91 centimeters; and Peking, 68 centimeters. The annual rainfall also decreases from the coast toward the interior of the empire. This can be clearly seen from the observations made at the rain gage stations in the valley of the Yangtsekiang. Thus Chinkiang has 104 centimeters of yearly rainfall, Wuhu,

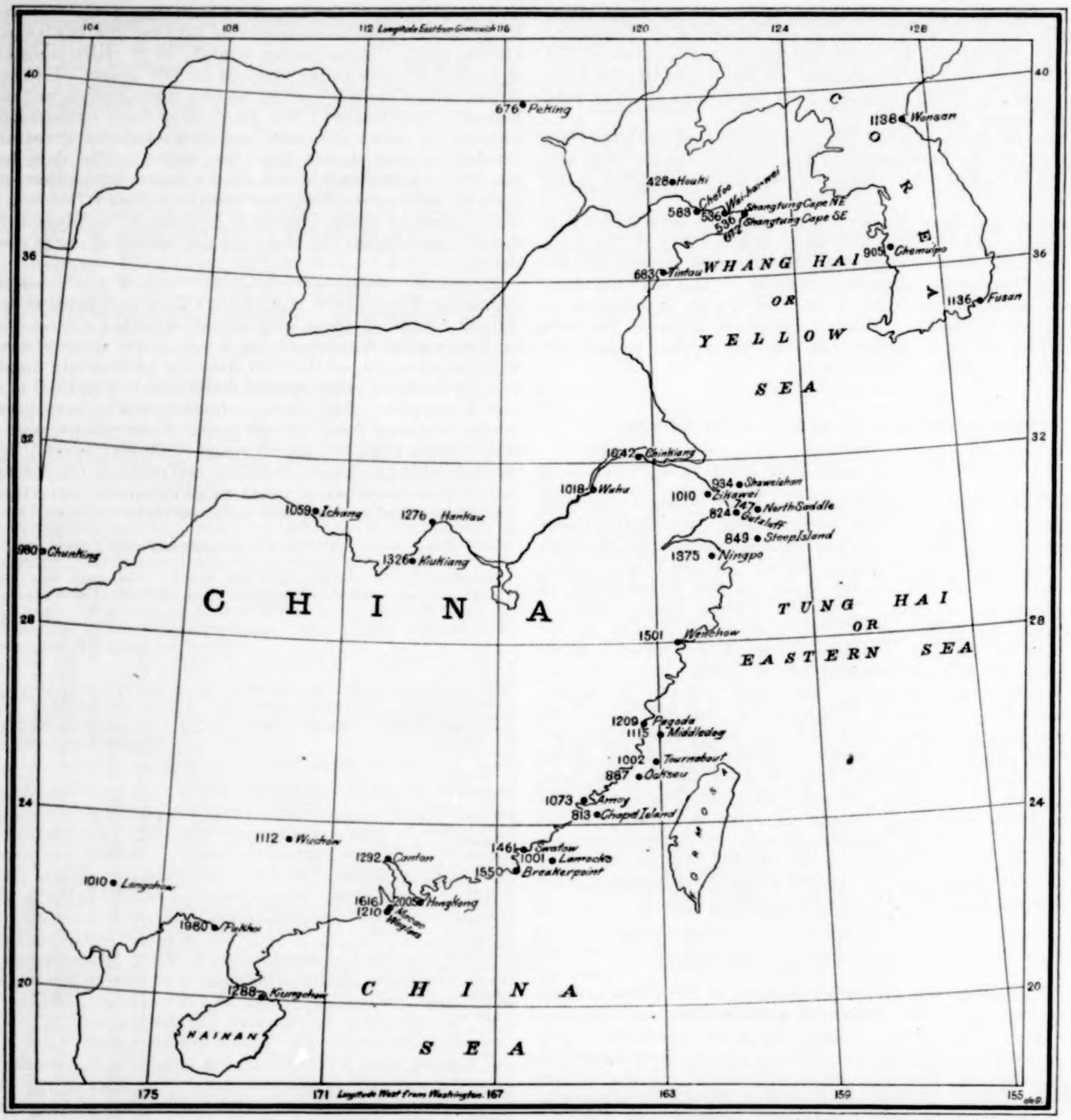

FIG. 1.—Rainfall of the Chinese and Korean coasts.

102 centimeters; Kiukiang, 133 centimeters; Hankau, 106 centimeters; Ichang, 98 centimeters; and Chonking, 98 centimeters.

In China the annual rainfall is subject to very large fluctuations, as Professor Supan has already remarked. In the northern portions of the empire this is especially the case, but it may be also observable in central China. In the following table are given the series of annual rainfalls for Peking, in northern China, and Hankau, in central China.

In Korea the annual rainfall is about 90 centimeters on the west coast, while it is generally above 100 centimeters on the east and south coasts. Thus there is a marked difference on both sides of the central mountain ranges which constitute the backbone of the peninsular empire.

Annual rainfalls in northern and central China.

Year.	Peking.	Hankau.
	mm.	mm.
1890....	992	148.0
1891....	169	116.1
1892....	868	1298.0
1893....	1084	1407.8
1894....	1009	1318.3
1895...	370	923.2
1896....	684	1517.1
1897....	674	1503.4
1898....	557	1130.3
1899....	351	1355.0

3. *Annual periods.*—In China the annual variation is very pronounced, and we may distinguish two different types of

variation; that is to say, the northern type and the southern type. In northern China, where the northern type of rainfall predominates, the rainfall mostly occurs in July or August, while February is the driest month. The summer is very wet and productive, while the winter is dry and cold. Most of the annual rainfall occurs during the summer and only a small part in the winter. In southern China the wettest month is June and the driest is December.

In Korea there are also two types of variation. In the northern part of the empire we have the greatest monthly rainfalls in August and the least in December, January, and February. In the southern part June has the most plentiful rainfall and February the least.

We give in Table 2 the observed mean monthly rainfalls for each station, without correction for the unequal length of the months.

TABLE 2.—*Mean monthly rainfall.*

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm*	*mm.*	*mm.*	*mm.*	*mm.*
Peking	3.7	5.3	11.8	30.8	22.8	166.3	287.0	127.4	46.0	16.4	9.2	2.1
Wonsan	39.4	24.6	47.5	57.4	54.0	127.8	189.5	248.2	228.7	61.2	44.7	15.1
Houki	2.7	1.4	8.3	22.5	30.2	52.6	122.9	110.5	32.9	21.5	12.7	5.0
Chefoo	9.2	4.3	10.3	18.9	22.3	51.4	183.9	179.3	40.1	22.6	24.2	16.1
Chemulpo	26.4	19.1	25.2	68.1	64.7	140.1	166.8	181.9	113.3	33.7	42.1	23.8
Shangtung Cape, NE	8.5	5.1	13.5	36.8	26.4	62.2	103.0	161.5	55.4	24.5	28.2	11.4
Shangtung Cape, SE	11.9	7.4	21.2	45.4	43.8	85.0	124.8	199.9	58.9	23.0	33.5	17.1
Wei-Hai-Wei	13.7	9.5	21.0	16.2	24.0	52.7	126.5	100.7	63.7	63.5	10.5	33.5
Tintau	6.5	7.5	40.0	43.3	44.2	52.1	175.6	184.5	39.5	53.8	7.7	27.9
Fusan	21.1	45.5	48.7	123.4	106.7	213.0	138.1	154.7	164.6	52.2	45.2	23.2
Chinkiang	52.7	37.7	88.6	78.5	105.5	161.6	195.9	118.1	101.2	30.3	42.1	29.6
Shaweishan	51.8	44.4	73.5	87.6	106.6	122.0	83.6	120.9	137.9	45.7	47.6	12.9
Wuhu	57.1	45.0	97.6	106.7	108.9	145.0	157.0	90.7	84.0	51.9	44.1	29.9
Zikawei	54.7	43.1	90.8	89.2	105.6	135.0	127.8	140.2	88.7	67.6	44.5	22.5
North Saddle	50.7	44.0	78.4	78.7	86.8	105.8	48.5	51.1	79.6	47.5	54.4	21.2
Gutzluff	52.3	42.6	90.1	94.5	60.8	98.6	69.0	71.9	114.2	58.6	46.9	24.3
Hankau	48.0	46.6	104.4	159.7	194.0	220.4	206.2	73.5	81.3	65.9	40.0	36.1
Ichang	15.4	26.4	51.6	122.2	131.6	122.6	181.4	175.1	114.0	74.8	26.5	17.7
Steep Island	57.7	51.4	93.0	98.6	92.4	123.8	60.5	69.8	66.2	62.0	46.2	27.0
Ningpo	80.6	84.9	108.3	127.1	121.3	186.1	118.7	147.9	188.9	130.2	51.6	29.7
Kiukiang	67.8	66.9	137.3	162.3	175.0	209.1	150.7	82.3	108.8	93.2	39.6	33.4
Chunking	13.7	22.3	36.1	107.2	140.0	145.8	122.4	90.6	126.3	102.3	53.3	19.5
Wenchow	59.6	97.3	121.4	14.8	174.1	254.9	124.5	196.2	130.0	111.2	59.3	22.9
Pagoda	55.2	99.8	91.7	125.6	135.4	176.1	143.5	104.2	171.8	54.4	32.0	18.9
Middledog	72.4	100.2	98.9	139.6	110.6	179.9	40.5	118.2	48.0	115.6	59.7	31.3
Tournabout	51.9	72.9	94.3	116.9	18.3	232.8	50.5	117.0	71.1	92.5	46.8	36.5
Ockseu	35.9	62.1	77.9	91.4	147.6	149.7	60.1	107.9	69.7	52.0	19.9	12.7
Amoy	33.2	75.5	69.6	95.1	176.0	164.4	114.1	153.8	81.7	54.9	36.9	17.8
Chapel Island	25.7	65.1	52.2	17.8	136.8	142.7	70.8	139.7	57.3	67.2	22.0	15.7
Wuchow	24.2	30.4	77.9	202.3	187.4	150.5	161.4	127.1	127.1	6.3	10.8	6.1
Swatow	38.0	86.3	53.5	109.1	246.4	279.7	157.1	188.7	148.2	91.9	44.4	17.3
Lamocks	27.7	42.1	34.0	72.2	145.0	176.2	118.3	174.8	117.2	58.2	23.6	11.7
Canton	17.1	15.2	66.0	172.0	227.1	311.2	151.5	163.9	110.9	47.3	2.7	7.6
Breakerpoint	31.2	58.5	34.5	102.7	206.0	297.0	175.6	310.9	156.3	109.2	48.7	19.0
Longchow	17.5	20.3	63.2	101.9	147.6	145.9	146.4	259.1	46.9	32.1	23.9	5.3
Hongkong	27.6	49.3	33.8	97.8	234.8	371.4	283.7	304.6	215.0	173.8	55.2	15.8
Macao	79.4	70.1	21.8	127.7	331.5	34.7	239.6	219.9	251.7	157.4	63.5	18.2
Waglan	31.2	41.2	36.2	56.0	146.4	318.4	140.0	224.0	105.7	73.4	31.2	6.2
Pakhoi	22.5	38.4	53.1	71.1	172.2	306.5	571.2	438.2	174.0	60.7	47.1	24.9
Kiungchow	9.2	16.2	28.2	153.9	156.0	226.3	220.0	194.8	140.1	46.1	54.7	42.6

4. *Number of rainy days.*—By "days with rain," as here given, is meant days on which the precipitation amounts to 0.1 millimeter or more. From some climatological points of view such a slight fall would be of little importance, but we have adopted the usual mode of counting the days with precipitation in order to be able to make a strict comparison with those in Japan and neighboring countries.

The number of rainy days is greatest on the coast from Foochow to Shanghai, and decreases thence toward the north and south. On the average, the coast of central China has 120 days of precipitation, southern China 80 days, and northern China 60 days.

Rainy days are generally numerous during the warmer seasons and scanty in the colder seasons. The difference between the two seasons is very remarkable in northern China. In central China and the valley of the Yangtsekiang, however, the rainy season begins in April and continues to June, as in Japan proper, where the rainy period, in the early summer, is commonly known as the "season of the plum rain," so called because then the plums are getting ripe. In Korea the number of rainy days is greatest on the west coast and least on the northeast coast. Thus, Chemulpo has 84 rainy days in a year, Fusan 76, and Wonsan 64. The rainy days are generally more numerous in summer than in winter.

Table 3 contains the average number of rainy days for each month and for the year.

TABLE 3.—*Average number of rainy days.*

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Peking	2	4	4	4	6	8	14	13	7	4	3	2	71
Wonsan	3	2	6	4	4	6	11	11	8	4	3	2	64
Houki	2	1	3	3	3	4	6	6	4	4	2	2	40
Chefoo	4	2	4	2	3	5	7	11	4	4	4	7	57
Chemulpo	5	4	6	7	6	9	12	13	7	4	5	6	84
Shangtung Cape, NE	4	1	2	3	3	5	6	6	4	3	4	2	43
Shangtung Cape, SE	3	2	4	4	4	6	7	7	4	3	4	4	52
Wei-Hai-Wei	6	3	5	5	4	8	8	8	5	6	4	9	71
Tintau	4	2	5	5	8	8	12	12	7	6	4	6	79
Fusan	3	4	6	8	8	9	10	8	8	4	4	4	76
Chinkiang	8	6	9	9	10	9	11	8	9	4	4	6	93
Shaweishan	7	7	8	8	8	8	6	5	6	4	4	3	74
Wuhu	8	7	11	9	10	7	8	7	8	5	4	6	90
Zikawei	11	11	14	13	12	13	11	11	13	9	6	7	131
North Saddle	7	7	9	8	9	8	4	3	6	4	5	5	75
Gutzluff	6	6	8	8	6	7	4	6	5	4	4	3	67
Hankau	8	6	11	11	11	8	8	6	8	6	4	5	92
Ichang	5	5	9	10	11	9	10	11	10	8	6	4	98
Steep Island	8	7	9	8	8	8	5	6	6	6	4	4	79
Ningpo	10	11	14	14	12	12	9	9	12	9	6	6	124
Kiukiang	9	9	13	13	13	11	7	7	8	7	4	5	106
Chunking	7	8	10	13	14	14	10	8	14	17	11	8	134
Wenchow	11	12	17	16	18	15	10	12	12	9	8	5	145
Pagoda	9	13	11	10	12	11	6	7	10	7	6	4	106
Middledog	9	13	12	11	10	9	4	7	10	12	7	6	110
Tournabout	8	9	9	9	8	8	3	6	6	8	6	4	84
Ockseu	6	8	8	8	8	8	4	7	3	3	4	3	70
Amoy	7	11	9	11	11	11	9	10	6	4	5	3	97
Chapel Island	5	8	6	7	7	7	4	7	4	3	4	3	65
Wuchow	7	7	10	13	12	12	13	11	6	4	4	3	102
Swatow	6	10	10	10	12	15	13	13	8	5	5	4	111
Lamocks	4	6	4	6	7	10	7	9	5	4	4	2	68
Breakerpoint	4	8	5	6	9	12	10	12	7	7	4	3	87
Longchow	6	8	12	14	11	11	12	13	7	5	4	4	107
Hongkong	10	10	11	13	16	21	20	18	12	9	5	4	149
Macao	8	8	5	7	12	14	14	14	13	7	4	4	110
Waglan	5	5	6	5	6	14	10	13	9	5	3	2	83
Pakhoi	8	11	12	9	10	14	18	17	11	5	4	4	123

5. *Greatest daily rainfall.*—In China heavy rainfall is a rather rare phenomenon, and such abundant downpours of rain as we often experience in this country (Japan) occur very rarely in the celestial empire. But falls of 100 millimeters in 24 hours are not rare, and most of these heavy falls occur during the four warmer months from April to August. We give here the dates of some of the heavy rainfalls, leaving further instances to the general Table 4:

Stations.	Amount.	Date.
	mm.	
Tournabout	363.3	June 6, 1894.
Breakerpoint	360.2	May 22, 1893.
Tournabout	292.2	September 8, 1892.
Swatow	270.7	May 23, 1893.
Wuchow	252.3	May 22, 1893.
Tournabout	213.4	May 19, 1895.
Breakerpoint	219.3	October 7, 1894.
Breakerpoint	208.3	August 11, 1897.
Ockseu	200.7	September 8, 1892.

In Korea heavy rainfall seldom occurs. A fall of more than 100 millimeters is a rare phenomenon. We have only a single instance of a heavy rainfall of more than 200 millimeters. The following table contains the greatest rainfalls of more than 120 millimeters observed at Fusan, Chemulpo, and Wonsan:

Stations.	Amount.	Date.
	mm.	
Wonsan	382.5	September 4, 1893.
Fusan	168.0	September 22, 1899.
Wonsan	164.6	September 6, 1901.
Fusan	129.0	June 25, 1898.

TABLE 4.—*Greatest daily rainfall.*

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
Peking	7.3	2.3	6.2	42.5	16.6	148.5	154.0	86.3	59.3	30.6	11.5	3.0
Wonsan	40.0	30.0	39.8	61.7	52.1	83.0	119.8	114.5	382.5	94.7	56.9	19.7
Houki	18.2	10.2	20.3	45.9	55.9	81.3	177.5	166.5	96.6	41.9	27.9	12.4
Chefoo	15.0	14.0	26.7	40.7	23.8	66.6	105.5	110.0	69.9	46.2	40.1	22.3
Chemulpo	38.1	29.2	19.0	63.4	45.7	87.6	108.0	106.7	104.3	43.3	44.5	15.2
Shangtung Cape, NE	26.2	22.9	24.4	55.9	22.9	78.7	74.7	141.2	88.8	53.3	44.1	27.9
Shangtung Cape, SE	28.7	16.0	27.9	48.3	59.4	78.5	104.7	115.5	96.9	36.6	45.0	17.5
Tintau	7.3	12.3	55.5	32.5	40.2	39.7	116.3	152.5	40.0	132.6	13.1	21.9
Fusan	39.0	89.5	36.5	79.0	83.5	129.0	87.0	118.0	168.0	96.0	52.0	46.0
Chinkiang	40.1	42.8	52.7	59.1	68.6	146.2	182.7	80.7	78.7	65.3	49.3	23.8
Shaweishan	44.5	30.9	37.6	60.8	50.8	60.8	55.5	127.0	120.7	83.8	73.8	16.5
Wuhu	31.0	40.6	45.7	44.5	51.4	78.2	136.7	62.0	60.8	50.0	54.7	26.0
Zi-ka-wei	55.8	24.6	34.9	57.0	54.1	135.6	76.4	113.2	68.7	53.3	49.2	24.1
North Saddle	38.1	23.9	33.5	55.1	65.6	74.9	47.4	85.3	90.8	84.4	47.6	19.0
Gutzlaff	45.7	27.9	48.7	45.8	38.1	110.2	63.5	103.9	152.4	50.8	40.9	25.4
Hankau	22.1	28.5	80.0	75.0	94.0	133.4	154.5	55.9	98.3	53.8	53.3	43.2
Ichang	10.2	30.0	29.4	73.7	69.7	59.7	116.8	92.3	70.9	58.2	17.3	30.4
Steep Island	45.5	41.8	40.3	55.9	48.5	57.2	73.8	44.0	55.4	54.9	40.2	30.3
Ningpo	38.2	38.1	44.5	38.1	43.0	94.3	114.4	88.9	127.0	129.5	51.8	26.3
Kiukiang	35.1	40.9	44.1	54.4	80.3	177.0	113.8	76.2	155.8	142.6	45.7	38.2
Chunking	6.8	10.2	23.4	81.3	71.7	74.5	99.5	81.0	54.9	25.1	23.9	14.0
Wenchow	43.2	54.1	33.5	42.0	44.5	95.2	148.6	81.3	61.2	73.8	44.5	30.4
Pagoda	40.7	52.1	38.1	53.1	97.7	94.0	70.7	77.5	108.2	24.4	50.5	28.4
Middledog	44.0	29.8	44.5	108.2	35.6	94.8	35.5	114.3	88.9	132.0	63.2	29.2
Tournabout	36.9	29.1	53.8	93.3	213.4	363.3	95.2	148.1	292.2	132.1	48.5	96.3
Ockseu	34.5	27.7	33.2	63.0	132.1	73.8	94.5	122.4	200.7	139.0	40.7	37.8
Amoy	23.1	81.9	61.7	43.7	118.1	115.3	122.0	102.0	102.0	101.0	49.3	27.2
Chapel Island	15.3	35.6	57.2	78.2	75.3	104.2	106.7	108.7	44.5	165.2	38.1	21.6
Wuchow	11.4	14.5	29.2	114.3	123.2	69.7	134.1	47.2	75.0	5.3	7.9	10.7
Swatow	30.2	91.2	80.0	169.9	252.3	166.4	118.5	68.9	124.8	114.3	55.3	20.6
Lamocks	30.5	24.6	29.0	55.9	270.7	85.1	139.5	162.6	72.4	85.8	54.3	28.0
Breakerpoint	43.0	38.1	21.1	67.3	360.2	137.2	170.2	208.3	127.0	219.3	120.5	42.4
Longchow	14.0	8.1	49.1	56.1	111.8	71.2	115.0	167.1	31.6	28.3	32.8	4.3
Hongkong	71.5	55.4	22.4	107.4	142.9	214.6	158.5	132.5	108.4	307.7	149.3	30.5
Macao	66.1	37.8	49.6	86.5	180.4	164.3	158.4	126.9	108.2	112.0	152.0	17.5
Waglan	22.9	50.8	27.5	43.3	102.4	136.7	55.9	150.0	50.8	79.5	40.6	8.9
Pakhoi	23.4	26.4	26.7	85.9	138.8	200.0	245.1	185.5	103.7	135.8	97.2	36.1

THE DEVELOPMENT OF METEOROLOGY IN AUSTRALIA.

By ANDREW NOBLE, Esq.

Dated Meteorological Branch, Sydney Observatory, Sydney, N. S. W., November 9, 1905.

The acting meteorologist of New South Wales, Mr. H. A. Hunt, recently received a letter from the Editor of the MONTHLY WEATHER REVIEW, asking that some one prepare for publication in that journal "a sketch of the development of meteorology in Australia." The following notes have been compiled in response to that request:[1]

It is necessary to explain at the outset that meteorology in Australia is still running under state auspices, and that the government astronomers at Sydney, Melbourne, Adelaide, and Perth, the hydraulic engineer at Brisbane, and the government meteorologist at Hobart are the recognized official heads of meteorology in their respective states. Only at Hobart, Brisbane, and Sydney is meteorology divorced from astronomy, and even in the case of Sydney the acting meteorologist still holds his position subject to the general control of the acting astronomer. Since this sketch practically emanates from the Sydney Observatory, New South Wales, the writer is placed somewhat at a disadvantage with regard to essential details bearing upon the progress of meteorology in the other Australian states. This fact should be emphasized in justice to the other states.

NEW SOUTH WALES.

Meteorological observations in Australia were probably first recorded systematically with reliable instruments at Sir Thomas Brisbane's private astronomical observatory, Paramatta, New South Wales, beginning in October, 1822, and continuing till March, 1824. Then occurs a break in the meteorological record at that observatory till the appointment (imperial) of Mr. Dunlop, who recommenced observations on January 1, 1832, and carried them on uninterruptedly till the year 1838. (See page 143, Rain, River, and Evaporation Results made in New South Wales during 1888.) In the meantime Captain King, during residence at Dunheved, New South Wales, from 1832 to 1839, and at Tahlee, New South Wales, up to 1848, kept a record of pressure, temperature, and hygrometric conditions, apparently giving much time, in collaboration with Mr. Dunlop, of Paramatta, to a study of the diurnal variation of pressure. Captain King was evidently a close student[2] of meteorology and did much to foster an interest in it during those early years. When the erection of the present Sydney Observatory was under contemplation he advised[3] the government as to where it should be placed. P. E. de Strzelecki, in his Physical Description of New South Wales and Van Diemens Land (London, 1845), draws extensively upon Captain King's observations for his discussion of the circulation of the winds round the coast of Australia. This work contains a valuable summary of the meteorological data available for the years 1838 to 1842, inclusive.

In April, 1840, the New South Wales government started three substations, viz, South Head (five miles east of Sydney), Port Macquarie, and Port Phillip (situated in what is now the state of Victoria). Educated convicts, who had been instructed by the astronomer at Paramatta, were placed in charge of these stations, and observations were carried on uninterruptedly, at South Head to 1855 and at Ports Macquarie and Phillip to 1850. In the meantime Capt. J. C. Wickham kept a record at Brisbane from 1840 to 1846, inclusive, the results being published in the Morton Bay Courier for January 23, 1847. Australian meteorology is greatly indebted to the Rev. W. B. Clarke for his untiring efforts in its behalf during those early years, beginning with his observations at Paramatta in the year 1839 and continuing long after the inauguration of the New South Wales service under government auspices in the year 1858. During this period Mr. Clarke read eighteen papers on meteorology before the local Royal Society and contributed a great many more to the daily papers. In the year 1842 alone he wrote twenty-one articles, covering a wide range of the subject, for the Sydney Morning Herald. From 1841 to 1847 he gave a large amount of time to the study of thunderstorms, and at his own expense established four observing stations in different parts of the colony for that purpose. The 19-year cycle theory, elaborated by Mr. Russell in more recent

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[1] In communicating this most instructive article by Mr. Noble, Mr. H. A. Hunt, the acting meteorologist, writes:

"Prior to receiving your letter no record of the verifications or otherwise of the forecasts for New South Wales had been kept in this office. We were rather diffident about keeping such a record here, and thought it advisable to test the feeling of those who are supposed to use the forecasts. Accordingly we sent copies of a circular requesting figures, showing approximately the percentage of verification, to a number of gentlemen. As the notice was so short we did not get figures from all, but the replies were generally most encouraging. Hereunder is a table showing the results as received from certain towns in New South Wales:

Place.	Verified.	Verified partially.	Failure.
Carcoar	75	15	10
Glen Innes	85	10	5
Temora	60	30	10
Bundarra	90	5	5
Breadalbane	71	26	3
Inverell	85	10	5
George Street North Post-office, Sydney	70	20	10
Peak Hill	70	20	10
Yass	85	10	5
Cowra	80	15	5
Average result	77.1	16.1	6.8

[2] As a lieutenant, in 1817, he was sent to complete the surveys on the coast of New South Wales, being engaged in that work till 1822. During this time, we are told, he "gave much attention to the physical condition and climate of the various parts of the coast which he visited." See his Maritime Geography of Australia, read before the Philosophical Society of Australia on October 22, 1822, and reproduced in Baron Field's Geographical Memoirs; also his Narrative of a Survey of the Intertropical and Western Coasts of Australia (London, 1827).

[3] Votes and Proceedings, New South Wales, 1852.

years, was advanced by Mr. Clarke in the Sydney Morning Herald of May 1, 1846.

William Stanley Jevons,[4] who held a position at the Royal Mint, Sydney, from 1854 to 1859, also kept a meteorological record. His observations fill a rather important gap between the closing of South Head as an observing station and the opening of Sydney Observatory. During his five years' residence in Sydney Mr. Jevons frequently contributed papers on meteorology to the daily press and to the Sydney Magazine of Science and Art. His valuable essay on "Some data concerning the climate of Australia and New Zealand" may be found in Waugh's Almanac for the year 1859.

Sydney Observatory was opened by the Rev. W. Scott, M. A., as astronomer, under government auspices, in the year 1858, and twelve meteorological substations were established in the same year, viz, Rockhampton, Brisbane, Casino, Armidale, Maitland, Bathurst, Paramatta, Sydney, Goalbwin, Deniliquin, Albury, and Cooma. Rockhampton and Brisbane, being situated in what is now known as Queensland, were subsequently passed to the government of that state, and the others were maintained until 1864, each station being fitted with a standard barometer, wet and dry bulbs, maximum, minimum, and solar radiation thermometers, and rain gage. Mr. Scott resigned early in the year 1862, and Mr. H. C. Russell, B. A., acted temporarily, pending the appointment of Mr. G. R. Smalley, B. A., on January 7, 1864. Mr. Smalley devoted considerable time to magnetic observations and expanded the meteorological work at the chief observatory, beginning publication of the results monthly in the year 1867, but unfortunately the number of country stations was reduced and for a time these results were not published. Mr. Smalley died in July, 1870, and Mr. H. C. Russell, who had joined the observatory in 1859, was appointed government astronomer. The stations which Mr. Smalley had closed were revived and voluntary observers were invited to cooperate, ultimately leading to a large growth in the service.

From February, 1877, to March, 1888, Mr. Russell published a daily weather map in the Sydney Morning Herald, showing by means of symbols the condition of weather, wind, and sea at 9 a. m. the previous day at a number of stations in South Australia, Victoria, New South Wales, and Queensland. In 1880 a diagram was added to the map showing by means of a curved line the corrected barometrical readings at the chief coastal stations round Australia. But Mr. Russell was apparently opposed to the issue of daily weather forecasts. These were originated in April, 1887, by Mr. Charles Egeson, meteorological assistant in the observatory, during Mr. Russell's absence in Europe. Upon the astronomer's return, an unsuccessful attempt was made to stop these forecasts. Mr. Egeson, in a statement subsequently published,[5] which Mr. Russell did not contradict, said:

> When Mr. Russell returned at the end of that year I was severely taken to task for lending myself to so progressive an institution, and was obliged to take leave of absence in order to put an end to the forecasting of the weather. The Evening News, however, insisted upon its continuance, and during my absence Mr. Russell had to attend to my former duties of forecasting the daily weather, which he has continued ever since.

The first daily isobaric charts of Australia and New Zealand drawn at the Sydney Observatory were also initiated by Mr. Egeson during Mr. Russell's absence in Europe.

Observations in New South Wales are taken at 9 a. m., excepting at a majority of the second order and climatological stations, where instruments are read at 8:30 a. m., so that transmission of the readings by telegraph may be expedited to the central office, where the forecast is issued at noon. Additional telegraphic information is also received from certain selected stations within the state, showing conditions at 3 p. m., 6 p. m., and 8 p. m., in order to compile press reports, and if necessary alter the forecast made at an earlier hour during the day. At the present time returns are received by mail regularly at the end of each month from 1903 stations distributed over the state. These stations are classified[6] as follows, viz: 28 second order, 168 climatological, and 1707 having a rain gage only. The results from all country stations have been regularly published in annual volumes practically since the foundation of the service, and a copy of this publication has been supplied to each observer at the end of the year in return for his cooperation in the work.

Owing to ill health, Mr. Russell went on leave of absence on October 14, 1903, and finally retired from the service on February 28, 1905, after 46 years' connection with the meteorological department in New South Wales. During the absence of Mr. Russell, the government of his state decided to temporarily sever the meteorological from the astronomical department, and on January 20, 1904, appointed Mr. H. A. Hunt to the office of acting meteorologist. [The reader is here referred to a note in the Quarterly Journal, Royal Meteorological Society, April, 1905, page 95, showing the progress made since Mr. Hunt's appointment.]

SOUTH AUSTRALIA.

Meteorological observations were begun at Adelaide, South Australia, by Sir George Kingston, in January, 1839, or three years after the foundation of that colony, and carried on by the same observer until 1878. In the meanwhile a record more or less complete was kept at the survey office until the establishment of the Adelaide Observatory under Sir Charles Todd, as Government Astronomer, in November 1856. During his lengthy direction of meteorology and astronomy in South Australia, Sir Charles has also held concurrently the office of superintendent of telegraphs and postmaster general. In his interesting paper[7], he writes:

> Since May, 1860, all the observations have been made at the west terrace observatory. For several years I had no assistant, and having a growing telegraph department to look after and control, the area of my work was necessarily restricted, and I labored under many disadvantages, but I early established meteorological stations at Clare, Kapunda, Strathalbyn, Goolwa, Robe, and Mount Gambier, and placed rain gages at the different telegraph offices. I also introduced the system of publishing at the head telegraph office in Adelaide daily reports of the weather and rainfall from all stations. * * * At Adelaide isobar maps have been issued daily since 1882, and we exhibit a diagram showing the barometric curve at selected stations along the south coast line from Albany to Cape Howe during the month, which enables persons to see at a glance the westerly progressive march of coastal depressions; and we have recently added a map which shows the distribution of rain in the colony on each wet day. We also publish monthly a statement of the rainfall at every station throughout the colony, compared with the average of the corresponding month in previous years, accompanied by a complete discussion of the characteristics of the month in regard to temperature, pressure, the passage of "highs" and "lows," and the weather generally, in which comparisons are made between the month under review and previous seasons, attention being drawn to any abnormal features that may have presented themselves.
>
> The annual volumes give in detail the observations at Adelaide, the principal results at outstations, and maps showing in graduated tints the general distribution of rainfall during the year.

According to Sir Charles Todd's last report issued, i. e., 1900–1901, observations at Adelaide are taken at 9 a. m., 3 p. m., and 9 p. m. There are 22 second order stations, at four of which observations are taken every three hours, commencing at midnight; at six others observations are taken at 9 a. m., noon, 3 p. m., and 6 p. m.; and at the remaining twelve, read-

[4] In after years professor of logic, mental and moral philosophy at Owens College, Manchester.

[5] Evening News, October 1, 1890.

[6] The central office in each state is of the first order, i. e., the instrumental equipment is complete and self-registering instruments are in operation. At second order stations the instruments in use are: Barometer (mercurial), dry and wet bulbs and maximum and minimum thermometers, and rain gage, while at climatological stations the equipment consists of maximum and minimum thermometers and rain gage, also, in some cases, dry and wet-bulb thermometers.

[7] Australasian Association for the Advancement of Science, 1893.

ings are taken at 9 a. m., 3 p. m., and 9 p. m. There are also 474 stations equipped with rain gages.

For the 12 years (1891–1902) the forecasts issued by the Adelaide Observatory have been verified to the extent of 83 per cent, while only 17 per cent were partially or wholly wrong.

TASMANIA.

A magnetic and meteorological observatory was founded at Hobart, Tasmania, on January 1, 1841, by Captain Kay, R. N., under imperial auspices, as part of an international scheme. Hourly instrumental readings were taken until the end of 1848, and regular observations up to December 31, 1854, when the Imperial Observatory was closed; but Mr. Francis Abbott continued the meteorological record until the year 1880, when Captain Shortt, R. N., was appointed government meteorologist, holding office until his death in 1892. He established eight climatological and about fifty rainfall stations in various parts of the island. Upon his death, the present director, Mr. H. C. Kingsmill, M. A., was appointed. In the year 1904, the service on the island state was classified as one first order and eight second order stations, while rainfall was recorded at ninety-one stations.

VICTORIA.

A nautical observatory was established under Mr. R. L. J. Ellery at Williamstown (about four miles southwest of Melbourne), Victoria, on July 13, 1853. It was at first used mainly for the determination and distribution of time, and rating of chronometers, but Mr. Ellery added a set of meteorological instruments to his equipment in March, 1854, and began observations of pressure and temperature in connection with his astronomical work. A meteorological record was also kept at Melbourne by Mr. Brough Smith from 1856 to the end of February, 1858, when the new magnetic and meteorological observatory on Flagstaff Hill was opened by Professor Neumayer,[8] and on February 28, 1859, the whole of the meteorological work in Victoria was placed under his charge. Hourly observations in meteorology and terrestrial magnetism during day and night were taken at the chief observatory without interruption to February 28, 1863. Neumayer established many stations inland and at light-houses on the coast. He also collected and published a valuable series of marine observations from the logs of ships trading between the different Australian and other ports. For this purpose instruments had been made, tested, and issued under his supervision at the Flagstaff Observatory. In the course of five years more than 600 logs had been examined, extracted, or copied. He also devoted considerable time to magnetic work, made extended trips into the country for that purpose, determined the magnetic elements at 230 stations, from sea level to 7200 feet above, and distributed in such a manner that the greatest distance between them was not more than 30 miles, and frequently only eighteen or twenty miles. By the commencement of February, 1864, Neumayer had completed his magnetic survey of Victoria. During these journeys, which extended over an aggregate of 11,000 miles, determinations of geographical positions, meteorological observations, and hypsometrical measurements were also undertaken. In June, 1863, the observatory at Williamstown was dismantled; Mr. Ellery removed his equipment to the new building now known as the Melbourne Observatory[9] and therewith the meteorological and magnetic observatory, hitherto under Neumayer, became absorbed. Mr. Ellery, as government astronomer, was given charge of the combined service, and thenceforward for a period of 32 years he directed the meteorology of Victoria. During this time, with the steady growth of the new colony, the service increased in size and importance. In January, 1881, a monthly publication on the meteorology and terrestrial magnetism of Victoria was initiated, and subsequently the regular issue of daily weather charts, together with forecasts of approaching weather changes. Mr. Ellery resigned in June, 1895, and was succeeded by Mr. P. Baracchi, the present director, who had joined the observatory 22 years previously. In his last report issued, i. e., March, 1904, Mr. Baracchi writes:

> This service (meteorological) has been continued practically under the same system and conditions as in previous years. The total number of stations existing at present under the official weather service is as follows, viz: One first order (Melbourne); 31 second order, making observations daily at 9 a. m., 3 p. m., and 9 p. m.; 42 climatological stations making observations daily at 9 p. m.; 748 rain-gage stations; 39 wind and weather stations, not provided with instruments, sending daily reports by telegraph.

QUEENSLAND.

Upon the foundation of Queensland as a separate colony the observing stations at Brisbane and Rockhampton, which had been started by the parent colony of New South Wales in the year 1858, were transferred, and Mr. Edmund MacDonnell was subsequently appointed meteorologist to the new colony, holding office till the end of 1886, and in the meantime establishing several climatological and rainfall stations. On January 1, 1887, Mr. Clement L. Wragge[10] was appointed government meteorologist, and speedily reorganized the whole of the Queensland service, adding many new and better equipped stations, which were well distributed over the colony. Shortly after his appointment Mr. Wragge began the regular daily issue of weather charts, reports, and forecasts,[11] not only for Queensland, but also for the other Australian colonies, including Tasmania, New Zealand, and New Caledonia, where the forecasts were telegraphed and published in the leading daily papers. During his régime in Queensland he classified his stations as follows, viz: 17 first order, taking observations at 3 a. m., 9 a. m., 3 p. m., and 9 p. m.; 44 second order, taking observations at 9 a. m. and 9 p. m.; 96 climatological, taking observations at 9 a. m. only; 511 rain-gage stations. He also established first order stations in New Guinea, New Caledonia, Fiji, and Norfolk islands, and a second order station in New Hebrides. With characteristic energy he also founded high level observatories on Mount Wellington, Tasmania, and Mount Kosciusko, New South Wales, together with their companion low level stations. At Kosciusko observations were regularly taken at midnight, 4 a. m., 8 a. m., noon, 4 p. m., and 8 p. m., from December 8, 1897, to July 1, 1902, when the station was unfortunately closed owing to a want of funds; and on July 1, 1903, the Queensland Weather Bureau ceased to exist for a similar reason. Mr. Wragge subsequently left Australia and the supervision of the Queensland service passed to the control of the hydraulic engineer, who has continued the practise of exchanging daily telegrams with the other states, showing weather conditions in Queensland, but no forecast is issued in that state at present.

WEST AUSTRALIA.

Rain and temperature observations were originated in Perth by Dr. H. Knight in 1860, and by the same observer continued to 1869. Toward the end of the year 1875 the government established a meteorological observatory at Perth under the direction of the surveyor-general, Sir Malcolm Fraser, and in 1877 Mr. M. A. C. Fraser was appointed observer, holding that office till February, 1896. During this period second order and rainfall stations were established from time to time as opportunity allowed. At the end of 1895 there were fifteen such stations. Mr. Fraser published a report regularly at the end of each year containing the results. In the year 1896 Mr. W. Ernest Cooke, M. A., formerly of Adelaide Observa-

[8] In after years Director of the Deutsche Seewarte, Hamburg.

[9] The site of this observatory was selected by Professor Neumayer as early as 1857, but the building was not completed till 1862.

[10] Formerly of Ben Nevis Observatory, Scotland.

[11] Mr. Wragge claimed 80 to 85 per cent verifications for his forecasts.

tory, was appointed government astronomer of West Australia, and immediately reorganized the meteorological department in that state, visiting nearly every outstation for that purpose. During his inspection the service was found to be in such an unsatisfactory condition, owing to the scant appropriations hitherto allowed, that he decided to keep the results so far obtained apart from those in future publications, excepting the rainfall at outstations and the climatic data for Perth. Mr. Cooke summarized the results for the years 1876 to 1899, inclusive, in a useful work on The Climate of Western Australia, published in 1901, and since his appointment he has also brought out complete annual reports containing the meteorological observations made in that state. Daily weather forecasts also form an important part of the work under Mr. Cooke's direction, as may be seen from the following results:[12]

Percentage of verification.

	Correct.	Partially correct.	Wrong.
General forecasts for the whole state, issued at noon	94	4	2
General forecasts for the whole state, issued at 4 p.m	93	6	1
Special forecasts for the gold fields, issued at noon	94	5	1
Special forecasts for the gold fields, issued at 4 p.m	91	6	3
Special forecasts for Murchison, issued at noon	95	3	2
Special forecasts for Perth and neighborhood, issued at 9 a.m	95	4	1

During the year 1903 the outstations were classified as follows, viz: 36 second order, 11 climatological, and 286 raingage stations. At Perth and all second order stations observations are recorded at 9 a. m. and 3 p. m. Additional readings are taken at 8 a. m. at all second order stations, also at a majority of the telegraph offices in the state, and wired to the chief observatory in order to assist in the preparation of the usual weather reports, isobar charts, and forecasts. The 3 p. m. observations are also transmitted from certain selected stations for a similar purpose. The barometer is read every two hours and the temperature every four hours at Cape Leeuwin and Breaksea Island for forecast purposes. In winter, especially, the forecast sometimes depends almost entirely upon the readings at these two stations, taken in consideration with the barograph curve at Perth and the general direction of the wind.

Mr. Cooke, in conjunction with Sir Charles Todd, has also established an observing station at the Cocos Islands, in approximate latitude 12° south, longitude 97° east, from which a report is received daily and repeated to the eastern states.

PRESENT CONDITIONS.

Unfortunately there has hitherto been a want of uniformity in the methods followed by the several meteorological services in the Australian states. This defect becomes apparant when we compare the observation hours of these services. In Australia we do not adhere to the standard time of a single meridian, as is done by the service under the control of the Weather Bureau at Washington, D. C. Here we have three different standards: Queensland, New South Wales, Victoria, and Tasmania are governed by the mean local time of the one hundred and fiftieth meridian; South Australia is governed by the one hundred and thirty-fifth meridian, and West Australia is governed by the one hundred and twentieth meridian. A want of uniformity is also shown when we contrast the different modes of publication, and the time they make their appearance. These defects are probably incidental to the gradual settlement and improvement of a new country, over which the population is unevenly distributed. Federation has only recently been achieved, and meteorology has not yet passed under the control of the National Government. Since colonization began in Australia, the greater part of our public funds have been absorbed in the opening up of roads, the construction of bridges, railways, buildings, and other public works. Meteorology has, therefore, not yet received that financial encouragement accorded it in older and more densely populated countries. The discussions at the intercolonial conferences of the several directors of meteorology held in the years 1879, 1881, and 1888, show an earnest desire to remedy existing defects, as far as the local exigencies of the different colonies permitted; but the Australian services have had to labor under many disadvantages, owing to the want of funds, and everything has had to give way to that consideration. The Board of Visitors to the Melbourne Observatory in their last report issued April, 1904, write:

> For a number of years the more important work of the Melbourne Observatory, both astronomical and meteorological, was regularly published by authority of the Government. In 1895, owing to retrenchment, these publications were limited to the annual meteorological statistics, and even these have been stopped since the year 1901. We now find a great accumulation of matter ready for the printer, in the procuring of which thousands of pounds have been expended, and which can be of no practical utility until it has been published and distributed. It comprises results of international value which are constantly asked for by observatories in different parts of the world.

In New South Wales the manuscript containing the results of the meteorological observations made during the year 1903 have just been returned to the Sydney Observatory, with an official note stopping publication, owing to a shortage in funds.

Since the advent of federation the telegraph service in Australia has passed to the control of the Commonwealth Government, which has imposed the following restrictions:

METEOROLOGICAL TELEGRAMS.

1. Subject to these regulations meteorological telegrams may be transmitted free of charge—
   (*a*) From the principal meteorological officer of a state to the principal meteorological officer of another state; or
   (*b*) From the principal meteorological officer of a state to an authorized observer at a reporting station; or
   (*c*) From an authorized observer at a reporting station to the principal meteorological officer of a state.
   Where cable charges have to be paid on meteorological telegrams they must be paid by the sender.
2. A meteorological telegram shall be sent as a message, and shall contain current meteorological information only, and must be in code and be concisely expressed, and, if a weather report, must contain not more than twelve words; and, if not a weather report, must contain not more than twenty words.
3. Meteorological telegrams shall only be sent when necessary, and shall not take precedence of ordinary telegrams.
4. All places from which meteorological reports were, before the 9th day of September, 1902, sent periodically to the principal meteorological officer of a state shall be deemed to be reporting stations, and the person in charge of any such station shall be deemed to be an authorized observer.
5. New reporting stations may be established with the consent in writing of the Postmaster-General, but not otherwise.
6. The words "principal meteorological officer of a state" shall include the principal of a meteorological department subsidized by a state.
7. The value of the services to be performed by the Postmaster-General's Department shall not, as regards any state, exceed in any year the value of the like services performed in the year ending on the 31st day of October, 1902, and, if the latter value is exceeded, the principal meteorological officer of the state shall pay to the Deputy Postmaster-General in that state the amount of the excess.
8. Meteorological telegrams not complying with these regulations shall be charged for as ordinary telegrams.

At the present time Australian meterology is under state jurisdiction, and each service is therefore only authorized to collect information within its own particular boundaries, but the chief observatories in each state keep up a regular daily exchange of telegrams showing conditions at about 8 to 8:30 a. m. for a limited number of stations. This interstate data is used for the construction of the usual isobaric chart, upon which the forecast is mainly based. The greatest difficulty the Australian forecaster has to contend against is the irregular transmission of his data by telegraph. At Sydney for example, we never receive the West Australian observations

[12] From the report for the year 1903.

(taken at 8 a. m.) before 1 p. m., and sometimes not until the following day; while our forecast, issued at 4 p. m., is sometimes not received at important country centers before 9 or 10 p. m. Australian meteorology is greatly indebted to the Eastern Extension Cable Company for many concessions. During upward of twenty years this company allowed weather cablegrams from New Zealand to pass free of charge. This data was a great advantage to the forecaster at Sydney, in the case of impending east to southeast gales, which sometimes visit our east coast, as the prevision of these gales depends largely upon the knowledge of the fluctuations in atmospheric pressure which take place between Australia and New Zealand; the data formerly received from three stations in New Zealand often completed the information required by the forecaster in order to warn shipping interests, but the cable company terminated their concessions on April 30, 1904, consequently we are now without knowledge as to conditions beyond our eastern coast line.

The ultimate solution of present difficulties may be worked out by the establishment of a Federal Weather Bureau to assume control of the different state services now existing. The Australian Commonwealth Constitution, adopted on January 1, 1901, gives the Federal Parliament power to make laws concerning many questions, and amongst these we find "Meteorological Observations;" but in meteorology the Federal Government is, apparently, very slow to act. Doubtless there are many other questions of greater national importance, demanding more urgent attention in a country which claims to be the newest among the nations. But, on the other hand, state politicians give the explanation that meteorology is nonrevenue producing, and for this reason, it is said, the Federal Government will be slow to pass laws for the establishment of a National Weather Bureau. The question of having such a bureau was apparently first considered by the Federal Cabinet about eighteen months after the inauguration of federation, or on May 15, 1902, but legislation was deferred apparently for three years. In May of the present year the several directors of meteorology in Australia held a conference in Adelaide for the purpose of reporting "on existing conditions and to make recommendations for the future conduct of the services," presumably in order to guide the Hon. Dugald Thomson, Minister for Home Affairs, who proposed to introduce a bill during the following session enabling the Federal Government to take over the astronomical as well as the meteorological departments in the several states. But the conference was not unanimous; only one director, Mr. Baracchi of Victoria, being desirous of separating meteorology from astronomy. A report of the proceedings contains the following recommendations:

(7) That a central institution be established for theoretical and scientific meteorology.

(8) That in each state there shall be an official whose duty it shall be to see that observations are properly taken, and all necessary local information supplied to the public. This official, in Sydney, Adelaide, and Perth, to be the Government Astronomer; but in Melbourne (as the Government Astronomer and his "Board of Visitors" desire to be relieved of all meteorological duties, on account of his more extended astronomical and scientific work), also in Brisbane and Hobart, where there is no Government Astronomer, the Weather Department shall be in charge of an officer appointed for the purpose, to be styled "State Meteorologist."

(Mr. Baracchi dissented.)

(9) That the weather service of Queensland and Tasmania be placed on a basis similar to that of other states.

(10) That weather forecasts shall be issued by each meteorologist for his own state, and for that state only, and shall be telegraphed immediately to the meteorologists of the other states, who shall see to their prompt publication.

(11) That a system of storm warnings for coastal districts shall be established upon some uniform basis for the whole of Australia, the warnings to be issued when considered necessary by the forecasting officials, each for his own state.

(12) That a definite period, say half an hour, shall be reserved each day by the Telegraph Department during which weather telegrams shall have precedence. (This is the practise in the United States.)

(13) That weather forecasts and storm warnings shall likewise have precedence over all other telegrams.

(14) That astronomical and meteorological telegrams shall continue to be transmitted free throughout the Commonwealth, but under amended regulations, in order to avoid the delays and difficulties which now occur.

(15) That meteorological reports be transmitted and exchanged on Sundays, in order that weather charts, forecasts, and synopses of the weather may be available for all days of the year, without interruption.

(16) That postmasters having charge of meteorological instruments shall take all necessary readings, etc., and forward reports as required, without any special remuneration, as is now done in several of the states.

(17) That it is essential that meteorological outstations be periodically inspected.

(18) That uniform methods of publishing the daily weather information are desirable, similar forms to be used in each state.

(19) That each State Meteorological Department should have a room at the general post office of the state, to which all telegrams shall be transmitted, so that no delay may occur in publishing the same for the information of the public. Facilities should also be provided by the postal authorities of each state for exhibiting at the general post office and other selected offices weather maps and bulletins.

(20) That daily reports should again be exchanged with New Zealand, and similar information should also be supplied by New Caledonia, Norfolk Island, and Fiji.

(21) That meteorological and ocean current forms be distributed to oversea shipmasters, the results to be discussed and published by one state or the central bureau.

(22) That each observatory shall not, as at present, issue an annual statistical report, but until the establishment of a central bureau, as recommended in (7), the observations shall be collected by one of the Government Astronomers, and published upon some uniform basis as a report upon the meteorology of Australia. It is suggested that this work be done by the Adelaide Observatory.

(Mr. Baracchi dissented.)

A change took place in the Federal Government shortly after the above conference was held, and the following note appeared in the Sydney Daily Telegraph of August 9, 1905:

The proposal for the creation of a Commonwealth Meteorological Department and Weather Bureau is still under consideration. Mr. Groom, Minister for Home Affairs, stated in the House of Representatives today that the Federal Government would again communicate with the State Premiers to see to what extent, in view of the report of the Inter-State Astronomical Conference, it would be practicable to establish a Federal department. A bill was in preparation with a view to introduction, if possible, this session.

The information in this paper has been drawn from many sources, but the writer is under special obligations to the following:

1. History and Progress of Sydney Observatory. By H. C. Russell. 1882.
2. Astronomical and Meteorological Workers in New South Wales. By H. C. Russell. 1888.
3. A Review of Meteorological Work in Australia. By Sir Charles Todd. 1893.
4. The Annual Reports issued by the Australian Observatories.
5. Wragge's Almanacs. 1898 to 1902.
6. The Australian Year Books. 1883 to 1904.

STORM WARNINGS FOR LAKE VESSELS.

By Prof. E. B. GARRIOTT.

The lesson that may be learned from the unparalleled series of disasters of the closing months of the present season of lake navigation is that modern vessels of low steam power can not safely brave the severer storms of the Great Lakes.

Shipping losses of previous years have been almost wholly confined to sailing vessels and old-fashioned steamers, and the escape from disaster during the last few years of low power steamers of the modern type has been due solely to the fact that they have not been subjected to gales of the violence that marked the Lake Superior storm of November 28. It is apparent, also, that a more perfect system of storm warnings and advices would lessen the liability of disaster, and it is equally apparent that a hearty and intelligent cooperation with the Weather Bureau by shipmasters is essential to the enlargement and more perfect operation of this service.

In the case of vessels that are in port when storm warnings are displayed, the service now rendered by the Government is as satisfactory as present knowledge of storms and facilities for disseminating advices regarding them will permit, provided, of course, shipmasters seek and are guided by the detailed information that the advices convey. Vessels that are leaving port and those that may be able to sight warnings displayed on shore possess no means of knowing the character, as regards intensity, of an approaching storm, and vessels beyond the sight of land are unable to obtain a knowledge either of storm-warning displays or of the qualifying or emphasizing advices that form a part of hoisting orders.

Assuming that the skill of the Government forecaster is limited to an issue of warnings twelve to twenty-four hours before the full force of a gale is experienced, and that conscientious and active interest on the part of the shipmaster impels him to secure all possible information from one or more of the numerous storm-warning stations that circle the Great Lakes, it is obvious that an extension of the service to vessels in the open lake can be accomplished only by new and improved methods of communication.

The recent loss in three lake storms of more than 100 human lives and millions of dollars' worth of property, which, it is assumed, may in part be attributed either to failures to receive or failures to heed the warnings, renders imperative the adoption of measures and methods calculated to increase the effective operation of the warning service.

A measure that is now a practise with careful commanders would require vessel masters before leaving a port to consult and record the latest forecasts and advices issued by the Weather Bureau. A second, that could be adopted with profit during the stormy fall months, would be to have vessel masters in the open lake shape courses that would permit them to sight at intervals the storm-warning display stations, and in cases where displays are observed to adopt measures that may in their judgment be of advantage to their employers, to the lives and property in their charge, and to themselves. A feasible method of extending the scope and area of the distribution of advices would be the equipment of stations and vessels with wireless telegraph apparatus. The operation of this latter method would require one or two wireless stations on each lake shore and the methods of wireless communication between shore and ships that are being adopted by sea going vessels.

The measures and methods here outlined are practicable and can be rendered operative by cooperation between the Government and vessel owners. In a few years their adoption will be demanded as a purely business proposition.

RECENT PAPERS BEARING ON METEOROLOGY.

H. H. KIMBALL, Librarian.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——

American Journal of Science. New Haven. 4th Series. Vol. 20. Dec., 1905.

Barus, C[arl]. Relations of ions and nuclei in dust-free air. Pp. 448-453.

Engineering News. New York. Vol. 54. Nov. 23, 1905.

Beardsley, J. W. Labor conditions in the Philippine Islands. [Includes observations of wind, temperature, and precipitation in Manila.] Pp. 538-541.

Nature. London. Vol. 73. Nov. 16, 1895.

Rotch, A[bbott] L[awrence] and Teisserenc de Bort, L[eon.] Exploration of the atmosphere over the tropical oceans. Pp. 54-56.

Nature. London. Vol. 73. Nov. 30, 1905.

Chree, Charles. Magnetic storms and auroras. [Notes on recent phenomena.] P. 101.

Proceedings of the Royal Society. London. Vol. 76. Dec. 6, 1905.

Lockyer, Norman, and Lockyer, Wm. J. S. The flow of the River Thames in relation to British pressure and rainfall changes. Pp. 494-506.

Quarterly Journal of the Royal Meteorological Society. London. Vol. 31. Oct., 1905.

Ball, John. On a logarithmic slide-rule for reducing readings of the barometer to sea-level. Pp. 285-292.

Fergusson, S. P. Two new meteorological instruments: 1. The automatic polar star light recorder; 1. The ombroscope. Pp. 309-316.

Hepworth, M. W. Campbell. Climatological observations at an Arctic station in Repulse Bay. Pp. 317-326.

Simpson, George C. Normal electric phenomena of the atmosphere. Pp. 295-306.

Strachan, Richard. Measurement of evaporation. Pp. 277-281.

Review of Reviews. New York. Vol. 32. Dec., 1905.

——Natural and artificial rain-formation. [Abstract of paper by Prof. von Schiller-Tietz]. Pp. 745-746.

Science Abstracts. London. Sec. A. Vol. 8. Nov., 1,905.

A[llen], G. E. Laws of distribution of size in raindrops. [Abstract of paper by A. Defant.] P. 634.

Scientific American Supplement. New York. Vol. 60. Nov. 25, 1905.

——Some curious phenomena of rainfall. Pp. 25000-25001.

Montgomery, J. New principles in aerial flight. Pp. 24991-24993.

Scientific American Supplement. New York. Vol. 60. Dec. 16, 1905.

——Thermometers, pyrometers, and thermo-regulators operated by the pressure of saturated vapors. [Abstract from La Science au XXme Siècle]. Pp. 25048-25050.

Symons's Meteorological Magazine. London. Vol. 40. Nov., 1905.

Jenkin, Arthur P. Periodicity of rainfall. Pp. 179-181.

Annales de Geographie. Paris. 14 année. Nov. 15, 1905.

Vacher, Antoine. Le haut Cher, sa vallée et son régime. [Precipitation at Montluçon]. Pp. 399-423.

Ciel et Terre. Bruxelles. 26 année. Nov. 16, 1905.

L[ancaster], A. La température de la France et des pays limitrophes. [Abstract of paper by A. Angot, with additional remarks on the temperature of Belgium.] Pp. 427-442.

Ciel et Terre. Bruxelles. 26 année. Dec. 1, 1905.

Gosselet, J. Essai de comparaison entre les pluies et les niveaux de certaines nappes aquifères du nord de la France. Pp. 476-478.

Comptes Rendus de l'Académie des Sciences. Paris. Tome 141. Nov. 6, 1905.

Maillard. Sur la trombe du 4 juillet dans l'Orléanais. Pp. 742-744.

Comptes Rendus de l'Académie des Sciences. Paris. Tome 141. Nov. 13, 1905.

Hergesell, H. L'exploration de l'atmosphère libre au-dessus de l'Océan Atlantique, au nord des régions tropicales, à bord du yacht de S. A. S. le Prince de Monaco, en 1905. Pp. 788-791.

Comptes Rendus de l'Académie des Sciences. Paris. Tome 141. Nov. 20, 1905.

Rey, M. J. Observations d'électricité atmosphérique sur la Terre de Graham. Pp. 850-852.

La Géographie. Paris. Tome 12. Aug. 15, 1905.

Legendre, A. F. Le Sseu-tch'ouan. Son sol, son climat, ses productions. Pp. 87-98.

Steen, Aksel S. La sécheresse en Norvège. Pp. 09-102.

Le Temps qu'il Fait. Mons. 2 année. Nov., 1905.

Bracke, A. Anciennes observations faites à Jemappes. [1845-1848. 1853-1857.] Pp. 203-212.

Bracke, A. Échos du concours de prévision du temps. Pp. 201-203.

Touchet, Em. Photographie des éclairs. Pp. 213-220.

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H. H. KIMBALL, Librarian.

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NOTES AND EXTRACTS.

A GUIDE TO THE OBSERVATION OF EARTHQUAKES.

The Strassburg Seismological Station has distributed a circular[1] throughout the world to all German consuls that will, it is hoped, concentrate our efforts to record and collect earthquake data. As we now reprint this circular we will request all to send their observations to the nearest consulate of the German Empire, or to the German Consul-General in New York, or direct to Prof. H. F. Reid, Johns Hopkins University, Baltimore, Md., or to the Editor, who will forward them properly. These observations will not be printed in the MONTHLY WEATHER REVIEW, but the records from our Weather Bureau seismographs and the special studies of Professor Marvin will be thus printed for the information of all.

[1] Reprinted from Beiträge zur Geophysik, 1905. VII Bd. 4 heft.

A GUIDE FOR THE OBSERVATION OF EARTHQUAKES.

1. IMPORTANCE OF THE INVESTIGATION OF EARTHQUAKES.

Few branches of science have in the last few years received such a great impetus as the investigation of earthquakes. The modern investigation of earthquakes dates from the time when, by the construction of highly sensitive seismic instruments, it was made possible to register at any point of the surface of the earth all strong shocks of the earth's

crust. The perfection which these instruments have lately reached places us in a position to trace around the earth the elastic waves proceeding from an earthquake with sufficiently strong intensity.

The number of stations equipped with such instruments is, however, still very limited; their distribution over the earth's surface has not been according to one uniform plan, but was dependent on necessary conditions which were frequently by chance fulfilled in a less appropriate place, but not in another more suitable one. The efforts of the International Seismological Association, which was founded in the year 1903 at the Second International Seismological Conference at Strassburg and to which almost all civilized nations belong, will in the first place be directed to creating a systematically arranged net of earthquake stations and to establishing observations according to uniform principles.

The records which the seismic instruments have so far given have already thrown important light on the nature of earthquakes, and above all on the nature of the movement, on the phases of which seismic disturbances are composed, on the direction from which most earthquake waves come, on the speed with which seismic waves are transmitted through and over the earth. But the principal value of modern investigation of earthquakes consists in the fact that, by the use of seismic instruments, it supplies a means for obtaining a better conception, than was for a long time possible, of the state of the interior of the earth, which is entirely concealed from direct observation.

In the meanwhile, instrumental observation alone is not yet sufficient to solve the most important problems of earthquake investigation. The first question of seismology concerns the establishment of "seismicity," i. e., of the seismic behavior of the whole earth.

In former years the attempt was made again and again to work out a catalogue of all seismic disturbances, and to publish annual specifications of all known earthquake disturbances in the form of a chronicle. The purpose thus aimed at was chiefly to discover the points or districts of the earth which are subject to shocks and from which the earthquake waves radiate over more or less great surfaces.

On account of the inadequacy and incompleteness of the reports of earthquakes in former years, it was impossible even to do tolerable justice to the first seismological problem. The manifold bonds, however, which to-day unite the nations to one another permit the hope that, by all the nations of the earth working together to a conscious end, it will be possible to solve a question which was formerly impossible of solution on account of international prejudices and jealousies.

In the first place it is the intention to publish a seismic atlas on the basis of the material stored up in the existing catalogues of earthquakes. This atlas is to give a cartographical representation of the extent of earthquakes and particularly of the position of the epicenters.

The second problem of seismology is to determine the relation of the position of the epicenters to the geological constitution of the districts in question, whether it is a temporary or a permanent relation, whether earthquakes displace the point of emergence, whether the energy of seismic activity is subject to changes in point of time and place, and lastly whether the frequency of earthquakes is periodic or not.

In the former state of earthquake investigation a solution of all these questions was not to be thought of, and even now many years of observation and a collection, as complete as possible, of earthquake data will be necessary if we wish to advance in this respect, for it is just in this second problem that instrumental observation alone does not suffice; here, on account of the personal observation necessary, science must fall back upon the voluntary cooperation of all educated people. From the records of the seismic instruments we can only gather the nature of the movement at the place of observation itself; we learn nothing about the extent and shape of the shaken area, about the different indications of intensity within the shaken district, or about the manifold accompanying phenomena.

Instrumental records and personal observations thus form a necessary complement of each other. If earthquake observation and investigation is henceforth carried on everywhere in this modern sense, seismology itself will have the first and greatest benefit. But there will also be a general, direct, practical profit from it. When the nature of earthquake waves has been more exactly investigated, when the correlation of the various manifestations of seismic power with the local conditions, which perhaps produce such manifestations, becomes better known, when we have established the chief epicenters and their appurtenant shaken districts, it will be possible, if not to indicate the earthquakes in advance, at least to find ways and means whereby the most destructive effects of the earthquakes can be obviated and life and property be saved.

It is the privilege of all educated people of the earth to collaborate in this great and difficult task.

The following remarks aim to present in a generally comprehensible manner the principal earthquake phenomena the exact observation of which is most important, thereby enabling everybody who is interested to collaborate in the service of science and for the good of mankind. Thereto are added instructions for the answering of questions, if it should be necessary, and the filling up of the accompanying question cards. In conclusion there is given a question card which may serve as a model, the data of which are taken from an actual case.

2. THE MOST IMPORTANT EARTHQUAKE PHENOMENA.

Earthquake is the name given to all those shocks, whether they can be perceived by the human senses or not, which owe their origin to any disturbance of equilibrium in the earth's mass, and which are transmitted, in the shape of spherical waves, as elastic vibrations, i. e., as waves of compression and rarefaction, through the medium of the earth's body from their place of origin. If the place at which the earthquake waves leave the earth's crust lies at the bottom of the sea, and if the spherical waves are transmitted across the body of the water to the level of the sea, it is called a submarine earthquake, or seaquake.

(a) *The shock of an earthquake.*

The periodically alternating compression and rarefaction of the material of the earth's crust which are caused by the disturbances of equilibrium in the bowels of the earth, form the waves of compression and rarefaction, the movement of which is divided into a vertical and a horizontal component. On account of the immense energy of tension and movement which is contained in the elastic waves, earthquakes show themselves in sudden shocks of different intensity.

Immediately above the subterranean earthquake seat and also in the neighborhood of the epicenter the vertical component preponderates. To human perception the shock of an earthquake makes itself felt as a shock from below in an upward direction. As the distance from the epicenter increases, the vertical component diminishes more and more until at last only the horizontal component of the motion remains. In this case the separate parts of the earth move to and fro horizontally and produce the sensation of an undulating motion. Thus the preponderance of one or the other component of the motion can be considered as a criterion for the estimation of the relative distance of the observer from the epicenter.

(b) *Number and duration of the shocks.*

In many cases the earthquake consists of one single shock and lasts only a fraction of a second, and the most terrible destruction is the work of an instant. In most cases, however, a whole series of shocks of different force follow one another at shorter or longer intervals. Generally, weak shocks come first; then the principal shock occurs, and the end of the shock is composed of vibrations becoming gradually weaker and weaker. The seismic disturbance may, however, begin at once with the strongest shock and then die away with weaker tremblings. In this case the whole series of shocks is designated the earthquake, and the duration of the earthquake comprises the time, inclusive of the intervals, which elapses between its first appearance and the last vibration. The duration of an earthquake is generally overestimated, because the observers are surprised by the sudden appearance of the phenomenon, and usually remain excited for a time after its end before they come to their senses and are able to realize what has happened.

When the number of shocks which follow one another in a comparatively short time is very large, they are called a swarm of earthquakes. The space of time over which the shocks extend may comprise several days, even weeks and months. If one and the same district is repeatedly visited by such earthquakes, it is called a regular earthquake district.

(c) *The after shocks.*

A very violent earthquake is frequently followed by a large number of after shocks. The stronger the principal shock and the smaller the shaken area, the more numerous the after shocks. The time over which the after shocks extend may comprise several years. With the increase of time, however, the frequency of the after shocks diminishes. The district in which the after shocks make themselves felt does not always correspond entirely with that of the principal quake; the epicenters of the after shocks often occur at different places within the principal shaken areas.

Observers are in the habit of paying no attention to the after shocks, because they attach no importance to them in comparison with the principal shock. In view of this, it must be emphasized that, from the standpoint of earthquake investigation, the same importance attaches to the after shocks as to the most violent shock. Accordingly, every after shock must, with regard to the time, duration, and intensity, be noted with the same care as the first shock. In one respect the observation of the after shocks is even more important than that of many other seismic phenomena. In all probability the appearance of the after shocks is dependent on the changes of the air pressure on the shaken area and on the attractive power of the moon and sun. The after shocks are thus best qualified to throw light on the question of the periodicity of earthquakes.

(d) *Intensity of earthquakes.*

The force of a shock is usually given according to a conventional scale. The best known and most used is the earthquake intensity scale which De Rossi and Forel devised. It distinguishes ten degrees:

I. Microseismic motion, recorded only by seismic instruments.

II. Shock registered by seismographs, observed by a small number of observers who are in a state of repose.

III. Shock observed by several persons in a state of repose; strong enough for duration or direction to be estimated.

IV. Shock observed by persons in activity; shaking of moveable objects (windows, doors), cracking of the floor.

V. Shock generally remarked by the whole population; shaking of objects, furniture, beds, isolated ringing of house bells.

VI. General awakening of those asleep; general ringing of house bells; oscillation of hanging lamps; stopping of watches; visible oscillation of trees; isolated cases of persons quitting their houses in terror.

VII. Overturning of moveable objects, loosening of plaster on the ceiling and walls, ringing of church bells, general terror, but no damage to buildings.

VIII. Falling of chimneys, formation of cracks in the walls of houses.

IX. Partial or entire demolition of certain buildings.

X. Great catastrophe, ruins, fissures in the earth's crust, land slips.

In general one may make the observation that earthquakes are stronger in the surface strata than in the depths of the earth. The effect of an earthquake depends in a high degree on the nature of the material of the earth's crust concerned. It can thus happen that one and the same shock will be felt very differently under otherwise similar conditions in places which are situated near to one another.

(c) Effects of earthquakes on the earth's surface.

Faults, cracks, fissures, which run off in the most manifold directions, intersect and thus cut up the land into blocks, belong to the very transitory, because superficial, changes of the earth's surface. As a rule they close up again of their own accord. If the fissure reach into the underground water, springs and small drains are affected.

There frequently occur round holes, which resemble an inverted cone and which throw forth slimy water when a violent earthquake takes place. In this case sand cones, which have the appearance of craters, are formed.

More extensive transformations of the earth's surface give rise to clefts which by a greater extension in length, breadth, and depth may become real faults and which may be combined with vertical and horizontal displacements.

Movements of masses, such as landslips, mountainslips, and subsidences take place with earthquakes only when the soil is composed of loose or water-sodden material.

Particular consideration should be given to the movements that are manifested during earthquakes by water, whether of lakes or of the ocean. In the lakes the water masses begin to oscillate or else waves arise on the surface. Flowing water may be made stagnant. The most remarkable, however, are the events which may be observed in the sea during coast earthquakes, namely, the so-called earthquake tidal waves. How the sea water behaves during a coastquake, whether it first withdraws from the bank or whether a rise of the water first takes place, is not yet established.

The damage to buildings is of particular importance for the estimation of the direction of transmission and of the intensity of the earthquake waves. Here, however, it must be remembered that the stability of the buildings in relation to the earthquakes depends principally on the material used in the building and on the construction. If in one case old decayed huts fall in, and in another case massive dwelling houses only show cracks in the walls, it is not immediately to be deduced that the violence of the quake in the first instance reached a higher degree than in the second.

According to A. Faidiga, the principal forms of destruction observed in buildings are as follows:

1. Complete or nearly complete ruin of the buildings.
2. Falling in of the gable walls, with preservation of the side walls and of the superstructure of the roof.
3. Preservation of the gable walls with a partial falling in of the side walls with the superstructure of the roof.
4. Destruction of certain corners, generally the upper ones, and of whole ledges of the building.
5. Falling in of the whole wallwork, together with a sinking of the superstructure of the roof.

The destruction of buildings is due, in the first place, to the fact that all their parts do not yield equally in the direction of the wave. If the extension of length coincides with the direction of the shock, cracks will arise lengthwise. If the wall stands perpendicular to the direction of the shock, oblique cracks will be formed, and these lead more easily to collapse. If the wall is presented obliquely to the earthquake waves, the direction and size of the cracks will follow the law of the composition and resolution of forces; here, it is true, irregularities in material and construction have a determining influence.

3. DETERMINATION OF THE POSITION OF THE EPICENTER.

Apart from the knowledge of the nature of seismic phenomena in themselves, the aim of earthquake investigation is above all directed to determining the position of the epicenter in every single case. For that it is necessary to have numerous individual observations, in as many different places as possible, of the beginning of the shock, its strength, direction, and effect, for every individual place of observation. For this, those communications which firmly establish the nonappearance of the whole quake or of isolated phenomena are of value. Such negative statements serve partly for the understanding of the inequalities of the shock, and partly to determine the gradual diminution of individual phenomena in its expansion, and also to determine as exactly as possible the limits of its expansion.

The three elements, intensity, direction, and time of the shock, which are necessary for the establishment of the epicenter, belong, it is acknowledged, to those which it is most difficult to determine in every earthquake. Thus the greatest care should be given to the observation of these three elements, and only reliable statements should be made. Experience tells us that, especially in the determination of the time, deviations of several minutes from the true time occur. The observation of the moment of the shock is not always exact even in telegraph offices and railway stations, because the necessary care in setting the clock to the official time is not everywhere used. The inexactness is still greater when it is a question of ordinary house clocks or pocket watches, and even the later comparison of the pocket watch with a clock showing standard time often gives faulty results in consequence of the uncontrolled timekeeping of the watch.

4. PHENOMENA ACCOMPANYING EARTHQUAKES.

Among the phenomena which among others follow in the track of earthquakes, the most important is the sound phenomenon. Most frequently these so-called earthquake sounds immediately precede the principal shock. But cases have also occurred in which they take place simultaneously with it and still continue after the end of the quake. The nature of earthquake sound is variously given as roaring, whistling, howling, rolling, thunder, cracking, bellowing, etc. On the whole, two principal groups may be distinguished, namely, sounds long drawn out like the rolling of thunder, or shortly broken off, like the explosion of a mine.

Earthquake sounds occur in both earthquakes and seaquakes. The force of the noise stands in no relation to the force of the shock; feeble shocks may be accompanied by a very loud noise and vice versa. In many places noises are heard without any accompanying shock being felt. These so-called ground claps have special names in different countries.

The following scale is proposed by J. Knett for estimating the force of the detonations:

1. Detonation of the very smallest force; only dimly audible amid the greatest quiet and by laying the ear upon the ground.
2. Detonation of small force; amid the greatest quiet and absence of wind distinctly audible in the air; more distinctly by listening on the ground.
3. Detonation of medium force; a noise distinctly audible in the open air even without complete quiet; distinctly audible in a quiet, closed room.
4. Detonation of great force; strong terrifying noise.
5. Detonation of the greatest force; violent, thunder-like; similar to the report of not far distant cannon; general terror among the population.

Light and fire phenomena are also often reported as accompanying earthquakes, but it is not impossible that this may be a delusion.

5. INSTRUCTIONS FOR FILLING UP THE QUESTION CARDS.

(a) One is recommended to fill up the card immediately after the event, when one is still under a fresh impression of it.

(b) As a rule, a separate card is to be used for each separate earthquake. Even when several after shocks follow the principal shock on the same day, a special card should be used for each separate distinct shock.

(c) Information which has been obtained later from other persons for the completion of one's own observations is to be written on special cards.

(d) For the sake of certainty, the day of the week should be added to the date of the earthquake.

(e) In giving the time, it must be added whether it is local mean time or standard time.

Whenever possible, one should give not only the time of the beginning of the quake, but also that of the principal shock and of the end of the quake.

It is not sufficient for the observer to state at what time the earthquake took place according to his watch; he should as soon as possible compare his watch with a well regulated clock (post office, telegraph office, or railway clock). If a railway clock is used, one must be guided by the clock used for the inner service, as in many stations the outside clock intended for the use of the public is wrong by five minutes.

The watch correction is, however, not to be applied to the time statement, but is to be entered separately. If one's own watch is five minutes fast in comparison with the standard clock, one places a + (sign of plus) before the number of minutes and seconds, or in the reverse case a — (minus sign). Thus, for example: $5^h\ 43^m\ 30^s\ (+\ 5^m)$.

Even if the observer possess a good timekeeping watch, his time statement is subject to more or less inaccuracy, because according to the circumstances, especially at night, a certain time elapses before one is able to read the time. On this account at least the limits should be given within which the phenomenon has been observed.

(f) It is of value to know how much of the time observed is taken up with a sound preceding, simultaneous with, or succeeding the shock.

(g) Since the direction of shock and direction of propagation do not always coincide, particular attention must be paid to the direction in which unsupported objects are overturned, or in which direction furniture is displaced, or in which direction hanging lamps or fluids oscillate. If clocks stop or pictures knock against the wall, the bearings of the walls should be given.

(h) With regard to the nature of the shock, it should be observed whether only one or several consecutive shocks were felt, and whether a jerky or wave-like movement or only a trembling of the ground was felt.

Other remarks concerning the composition of the soil, etc., must be left to the discretion of the observers.

6. QUESTION CARD.

Earthquake.................(day of the week).................19
Place.
At what time? h m s (local mean time) (standard time)
A. M. or P. M.?
Where was the observer?
In the open air?
In a house?
In which story?
Number, duration of the shocks?
Direction of the shocks?
What effect had the earthquake?
Earthquake sounds?
Behavior of springs, wells, etc.
Other remarks.
Address of the observer.

7. SAMPLE OF EARTHQUAKE NOTICE.

Earthquake. Monday, January 19, 1889.
Place. Ascoli Piceno.
At what time: 8^h a. m. M. T. Rome.
Where was the observer? In the open air.
In which story? ———
Number and duration of the shocks: One shock; two seconds.
Direction of the shocks: E.—W. jerky, VIII.
What effect had the earthquake? Cracks in the walls.
Earthquake sounds. ———
Behavior of wells, springs. ———
Other remarks: Church bells began to ring. General flight from the houses.

Data desired relative to seaquakes.

1. Position of the ship at the time of the earthquake.
   What course was the ship sailing and how many knots was she making?
2. Place of the observer.
   Was the seaquake felt by the observer below the deck or on deck?
3. Time of seaquake.
   At what moment was the seaquake perceived?
4. Kind of motion.
   (a) Merely trembling or shaking or shocks?
   (b) Was the motion vertical or undulatory?
   (c) Were the shocks preceded by a trembling motion or were they followed by such a motion?
   (d) What is the motion to be compared to, and what impression did it make upon the observer?
5. Direction of the propagation of the motion.
   Was the direction of the motion from bow to stern or vice versa, or can a certain direction by the compass be stated?
6. The intensity of the earthquake is to be given in degrees of the following scale:
   I. Quite slight trembling, more like a noise; mostly heard only below deck (III of the Rossi-Forel scale).
   II. Slight trembling, by which a sleeping crew might be awakened (IV of the Rossi-Forel scale).
   III. Trembling of the whole ship, such as might be caused by large casks being rolled across the deck (IV of the Rossi-Forel scale).
   IV. Moderate shaking like that felt when the anchor cable is quickly slipped (IV of the Rossi-Forel scale).
   V. Rather a strong shaking, as if the ship were scraping on rough ground (IV of the Rossi-Forel scale).
   VI. Strong shaking by which light things may be moved; the wheel jerks in the hands of the steersman (V and VI of the Rossi-Forel scale).
   VII. Very strong shaking by shocks so as to make the timber work crack and to render it impossible to keep on one's feet (VII of the Rossi-Forel scale).
   VIII. Very strong shaking by shocks; masts and rigging as well as heavy things on deck are shaken (VIII of the Rossi-Forel scale).
   IX. Exceedingly strong shaking by shocks; the ship is thrown on its side, slackens, or is stopped (IX of the Rossi-Forel scale).
   X. Destructive effect; people are thrown down upon deck, the joints of the deck burst, the ship becomes leaky (X of the Rossi-Forel scale).
   Did the intensity vary with the single shocks or during the whole phenomenon?
7. Duration of the seaquake.
   (a) What was the duration of the shaking itself, apart from the noise, by which it was accompanied?
   (b) Were there single phases to be distinguished in the phenomenon?
8. Sounds.
   (a) Was a noise heard, and what was it to be compared to?
   (b) Did the noise precede the shaking, was it at the same time, or did it follow it?
9. Sea surface phenomena.
   (a) What was the state of the sea surface before the seaquake took place?
   (b) Did it remain in the same condition, or did any changes take place during the seaquake?
   (c) Was a single peculiarly high wave observed or a succession of them (height and length)?
   (d) Was the level of the sea, although smooth, raised, or did it bubble like boiling water?
10. The compass.
    Did a sudden variation of the needle take place during the seaquake?
11. Meteorological phenomena.
    (a) Was the temperature of the sea water higher after the seaquake than it was before?
    (b) What was the atmospheric pressure?
12. Extension of the seaquake.
    (a) Were any other ships near at the time of the seaquake, and if so, at wnat distance?
    (b) Was the seaquake perceived by them or not?
13. Earthquake and seaquake.
    In case the ship is lying in a harbor, inquiries are to be made on land concerning:
    (a) The beginning.
    (b) The intensity.
    (c) Th3 duration of the earthquake.
    What difference was there between the earthquake and the seaquake as to these three points?
14. Condition of the sea in the harbor during an earthquake and a seaquake.
    (a) Had the shaking any influence upon the water in the harbor?
    (b) Did any breakers come in at the moment of the shaking or immediately after it, and if so, how many, how high, at what intervals?
    (c) Did the ship drag her anchor and were any currents perceptible.
    (d) Did a so-called earthquake tidal wave take place, and if so, how long after the beginning of the earthquake; how many waves, what height, at what intervals?

INDIAN SUMMER.

A correspondent writes to inquire "the time and duration of Indian summer" for the latitude of Washington, D. C.

Indian summer is an extremely indefinite season as to its date and its character. There has never been any determination of its average date and duration so far as we know. It is often described as a warm, dry, hazy period after the first severe frost in autumn, but it often fails to come at all.

The date of the first severe frost at Washington has ranged, since 1871, from October 2 to November 15, and at Baltimore, during the same period, the range has been between October 6 and December 6. This might serve to fix the earliest possible date for the beginning of Indian summer.

The paper by Mr. Albert Matthews on "The Term Indian Summer," which appeared in the MONTHLY WEATHER REVIEW for 1902 on pages 19 and 69, is one of the most complete and exhaustive discussions of the subject and its perusal is recom mended to those who take an interest in this subject.

A LECTURE ON SNOW CRYSTALS.

Our esteemed correspondent, Mr. W. A. Bentley, of Jericho, Vt., whose beautiful photomicrographs of snow crystals are known the world over, devotes his whole thought to the prosecution of this work. Being unable to leave Jericho, owing to

the illness of his mother, he therefore must cooperate with others by correspondence. Not long ago he wrote out an interesting lecture on snow crystals and sent it with many lantern slides to a friend at the Brooklyn Institute of Arts and Sciences, where the lecture was delivered with great success. This suggests that other instructors, lecturers, lyceums, etc., may also secure material for an interesting lecture on a new topic and thus interest the public in meteorological matters. We hope that the State superintendents of schools will take this matter up officially as a proper branch of nature study in school work.

PHYSICAL SOCIETIES AND JOURNALS.

Many of the readers of the MONTHLY WEATHER REVIEW are deeply interested in those branches of the study of mathematics and physics that bear on meteorology, and desire to keep in close touch with the progress of our knowledge along these lines. This can be best accomplished by becoming an associate member of either the American Physical Society, the American Mathematical Society, or the Astrophysical Society. The first named offers special advantages, since its members receive Science Abstracts and the Physical Review regularly. These monthly periodicals bring to one's attention much of what is new in physical science. Those who wish further details should correspond with the Editor, or with the secretary of the American Physical Society, Prof. Ernest Merritt, Cornell University, Ithaca, N. Y.

A journal of scientific news is as essential to the student as a daily paper is to the business man. It would be convenient if all meteorological matters were published in one journal, but this has never yet been done, and one must read several in order to compass the field. The more important periodicals are the following:

IN ENGLISH.

American Journal of Science, New Haven.
Astrophysical Journal, Chicago.
Proceedings of the Royal Society, London.
Quarterly Journal of the Royal Meteorological Society, London.
Science, New York.
Symons's Meteorological Magazine, London.
Science Abstracts, London.
London, Edinburgh, and Dublin Philosophical Magazine.
Scottish Meteorological Magazine, Edinburgh.
Terrestrial Magnetism and Atmospheric Electricity, Baltimore.
Nature, London.
Physical Review, Lancaster.

IN FRENCH.

Annuaire de la Société Météorologique de France, Paris.
Archives des Sciences Physiques et Naturelles, Genève.
Bulletin de la Société Belge d'Astronomie, Bruxelles.
Comptes Rendus de l'Académie des Sciences, Paris.

IN GERMAN.

Annalen der Hydrographie und Maritimen Meteorologie, Berlin.
Physikalische Zeitschrift, Leipzig.
Gaea, Leipzig.
Das Wetter, Berlin.
Meteorologische Zeitschrift, Wien.
Naturwissenschaftliche Rundschau, Berlin.
Annalen der Physik, Leipzig.

COLD AND HEAT.

The following inquiry, which seems to be going the round of the press in the West, has been forwarded to the Chief of the Weather Bureau with a request for an authoritative answer:

"How cold is it when it is twice as cold as two degrees above zero (Fahrenheit)?"

The expression "twice as cold" has no definite meaning and is not used in scientific language nor in rational popular English. We simply say "warmer" for more heat and "colder" for less heat.

It is customary to measure the condition of bodies only with respect to heat, not cold. The scale by which the relative hotness of bodies is measured is the scale of temperature, the starting point of which is the temperature at which the molecular vibrations that constitute heat cease. This point is called the absolute zero of temperature. The absolute zero of temperature is 459° below zero (—459°) on the Fahrenheit scale, at which temperature a body has no heat and is said to be at 0° on the absolute scale of temperature.

A body at +2° F. may therefore be said to have 461 Fahrenheit degrees of temperature on the absolute scale. "Twice as cold" might be considered to mean one-half as hot. If so, then anything that is twice as cold as something at 2° F. must have one-half of 461 degrees of temperature, or 230.5 degrees. The temperature on the Fahrenheit scale of a body having 230.5 degrees of temperature on the absolute scale is $-459° + 230.5° = -228.5°$, or 228.5° below zero Fahrenheit.

It is not possible to say anything more definite than this, as the expression "twice as cold" can have no real significance until a scale for measuring cold has been adopted. Heat is measured upward from the absolute zero of heat, but cold must be measured downward from some arbitrary point that has never yet been defined.

METEORS: THEIR INCANDESCENCE AND THEIR NOISE.

In Nature for October 19, 1905, Mr. George A. Brown suggests that the incandescence of shooting stars has an electrical origin, or that the heat evolved is due to the passage of the meteor across the lines of force in the earth's magnetic field. To this Prof. A. S. Herschel replies that although such induced electric currents must exist, yet the heating effect must be extremely small and incomparably subordinate to the heat evolved by the adiabatic compression of the air against the front surface of the meteor. He calculates that—

> If the kinetic energy of translation in foot pounds of one pound of air at the meteor's velocity be divided by 330, the number thus obtained, 1,180,620, will be the number of centigrade degrees through which the air will be heated by the pure process of compression. This relates to the air in immediate contact with the front of the meteor, and lower temperatures would prevail in the layers outside of that.

He thinks that the induced electric and magnetic phenomena are unimportant for both the stony and the metallic meteors as compared with these enormous thermal effects, but he seems to suggest that electricity may explain the long enduring bright streaks left along the paths of all the brighter shooting stars and larger meteors.

The compression of the air in front of the meteor takes place so rapidly, owing to the great speed of the meteorite, that the gas has no time to dissipate in front or to spread out on all sides. It is compressed and intensely heated by the impact, but remains a perfect, frictionless, elastic fluid. Within this small mass of heated air the speeds of the sound waves differ from the speed of flow of air itself in proportions or ratios that diminish asymptotically toward the ultimate ratio $\frac{1}{\sqrt{5}}$. Within this mass of hot air are sound waves conveying the strokes and shocks of the collisions to and fro between the meteor's center and the surrounding quiet air. Such sounds begin, travel, and end within the moving field of heated, compressed air as if it were at rest, although really

fresh particles of air are continually entering the field with new collisions and starting new waves of sound while the older particles and their waves fall away.

By these extremely rapid actions and in an exceptionally perfect elastic fluid a steady relation or steady disposition of the lines or lanes of air flow and blast pressure must really be established and maintained in evenly persistent shapes and contours within the swirl of incandescent air which forms the meteor's head.

As every meteorite shows a thin surface layer of its own material to have been heated, burned, pushed, scraped, or dragged off as by the flow of some blast of hot air, we must add this small mass of meteoritic dust, this heated, incandescent, vaporized, and burning solid, to the incandescent gas that constitutes the meteor trail. This incandescent dust is a new chemical compound of meteoritic matter and atmospheric gases and is left behind as a long, comparatively straight, luminous streak. Observers have watched such streaks for many minutes, and the changes in their apparent shapes do not seem to us to require any assumption of electric or magnetic action for their explanation. A long streak of isolated particles of iron rust does not constitute a magnet, nor could it show any magnetic phenomena under magnetic influence, excepting such as are revealed by individual positively and negatively electrified ions in a perfect vacuum, such as have been revealed to us by the well-known studies of J. J. Thomson. That the streaks do not show such phenomena demonstrates the absence or feebleness of the magnetic and electric fluids in the upper atmosphere of our earth.

It seems to the Editor that the noises that emanate from the meteors are still as difficult of explanation as ever. Professor Herschel's exposition brings vividly before us the waves of sound that are being interchanged between the mass of the meteor and that of the compressed air in its neighborhood, but how can these sound waves reach the ear of an observer through the rarefied atmosphere that exists at a very short distance from the meteor. This atmosphere is so thin or so rare that not only are ordinary sound waves not observable through it, but, according to our present theory of sound, could not even exist therein. Meteors that are 50 miles above the earth's surface and moving nearly horizontally give out sounds that are heard like the discharge of a nearby cannon, although the observer is 150 miles away. This has been notably the case with several that have been investigated in the United States. At these great elevations the gaseous pressure of the atmosphere, that is to say, the elastic pressure which follows the law of Boyle and Mariotte, no longer exists. The individual particles are so far apart that, according to the kinetic theory of gases, the collisions among the particles are infrequent. A meteor rushing among these at the usual meteoric rate of 20 miles per second strikes the individual particles and drives them forward far more frequently than they strike each other; they would, in fact, be entirely submissive to its influence, and, after escaping therefrom, they would find no surrounding atmosphere capable of transmitting sound waves downward to the denser atmosphere near the earth's surface. The sound waves observed in connection with meteors are always described as resembling the booming of an irregular discharge of artillery, rumbling like thunder, coming first from a point on the track of the meteor nearly opposite to the observer, but then from points successively farther back on the preceding parts of the track. It is never heard from points on the subsequent parts of the track. The physical explanation of this phenomenon has been attempted by many, but we know of nothing sufficiently satisfactory to be worth repeating. The rolling of thunder takes place in an analogous manner, but that relates to the lower, denser atmosphere. In our report on the meteor of December 24, 1873, we showed that, if the whole meteor track nearest and opposite the observer be considered as a straight line every point of which became instantaneously the source of sound, then the observer should hear first a crash and subsequently the roaring noises from the more distant preceding and succeeding portions of the line. But why should it always roll backward, and how can any sound at all pass from the thin upper air down to the earth? It does not do to say with Professor Mach and others that every stroke of the meteor against an atom of air is a collision and that a myriad such strokes will make a noise, for this only explains the vibrations within the mass of the meteor and within the volume of compressed air attending it; it does not explain the passage of such sounds to the observer through the "Crookes vacuum" of the upper air.

METEOROLOGICAL LITERATURE IN THE PUBLIC LIBRARIES.

In connection with a lecture on "Storms," delivered by Mr. John R. Weeks, official in charge of the local office of the Weather Bureau at Binghamton, N. Y., a local newspaper, the Press Leader, published a list of the books on meteorology procurable at the Public Library, in order that those who wished to prepare for the lecture, and those with a desire to go further into the subject, might be guided to the proper sources of information.

This practice is commended to other Weather Bureau lecturers as being a means of increasing the interest of the public in the subject of meteorology. It will also stimulate the librarians to provide the necessary books when called for.

The Librarian of the Weather Bureau has compiled and published a list of books for use in studying meteorology, which will no doubt prove valuable to Weather Bureau officials and others who are called upon to select or advise in the selection of authoritative books on meteorology.—*E. R. M.*

STANDARD TIME AT KEY WEST.

On November 16, 1905, the board of aldermen of the city of Key West, Fla., decided to change the standard of time in local use from ninetieth meridian time to seventy-fifth meridian time, the change to be effected by omitting the hour between 11 a. m. and noon on Thursday, November 23, 1905. This action was taken "in order that the time on the city clocks might be the same as that of the naval station, the telegraph office, and the ships calling there."

In order to comply with the provision of Weather Bureau Instructions No. 210, of 1904, dated December 16, 1904, which requires that "all instrumental records and the daily local record shall be kept on local standard time," it has been directed that seventy-fifth meridian time be used as station time at the local office of the Weather Bureau at Key West, Fla., beginning immediately after 12 midnight of December 31, 1905.

Those who have occasion to consult the original records above mentioned should bear in mind that they have been prepared on ninetieth meridian time during the year 1905.

INFLUENCE OF LOCATION ON THE WINDS.

An article on the influence of orography on the winds at Quebec, by Monsignor J. C. K. Laflamme, professor of geology, etc., at Laval University in that city, brings out strongly the fact that the winds recorded at this meteorological station are controlled almost entirely by the configuration of the neighboring ground, and this too, to an extent that would hardly have been expected, notwithstanding the fact that the broad valley of the St. Lawrence has a general trend that coincides with the prevailing general movement of the atmosphere. The memoir is published in tome 10, of the second series of the Memoires de la Société Royale du Canada.

Speaking of the same subject, Prof. R. F. Stupart, Director of the Canadian Meteorological Service, says:

There is an undoubted tendency for the wind at Quebec to blow either up or down the river, e. g., when the barometric gradient would indicate an easterly wind, not uncommonly Quebec reports northeast, or when from the gradient northwest winds are indicated southwest winds are reported.

As regards the velocity, I question whether the highest winds occur near the city of Quebec. I am rather of the opinion that they occur farther down the river. Father Point wind velocities are usually higher than those registered at Quebec. Monsignor Laflamme's description of the geographical situation of Quebec is, I think, admirable. This situation is doubtless the cause of the greater preponderance of northeast and southwest winds than at other points in the river and gulf, but on the other hand I imagine that the various winds in the province generally are not by any means the outcome of mere local conditions in that province. The wind circulation there is connected directly with the general circulation over the continent.

With regard to the conditions which produce the wind circulation over the continent, the Weather Bureau and Canadian meteorological records show that the general track of storms in the colder months is either from the Great Lakes or Atlantic States to the Gulf of St. Lawrence and thence to the North Atlantic; this stream of low areas, with the high areas moving southeastward from the Northwest Territories to the Great Lakes or Middle States, produces the prevailing westerly winds in the Gulf of St. Lawrence.

As the spring advances the general tendency becomes more pronounced for the high areas to develop over the northeastern portion of the continent in the neighborhood of Hudson Bay and move southeastward, while the hovering low becomes more frequent near the Great Lakes and the northeast parts of the United States, and such conditions produce easterly gradients over the whole St. Lawrence Valley; there is not the same marked prevalence of northeast winds at stations on the Gulf of St. Lawrence as in Quebec. Later on again as the summer advances, the continental low spreads eastward across Canada toward Labrador, and southwesterly and westerly winds become prevalent in Quebec.

During the past three years observations have been taken at Cape Fullerton, the northwest point of Hudson Bay, and I find that, with Dawson, Fort Chippewyan, Norway House, York Factory, and Moose Factory, a very interesting weather chart of the northern part of the continent is obtained, and one which will be useful in the study of the cold waves.

A MISTAKE ABOUT ATMOSPHERIC DUST.

The importance of dust in the economy of the atmosphere is not to be underrated, but neither should it be overestimated.

We notice a paragraph going the rounds of the newspapers on the authority of the Sunday School Times, saying:

While the dust contains many of our mortal enemies, it is also one of our very best friends, and the finer it is the more we owe to it. If there were no dust, the sky would not be blue, there would be no raindrops, no snowflakes, no hailstones, no clouds, no gorgeous sunsets, no beautiful sunrises. The instant the sun passes out of sight we should be in darkness; the instant it rises it would be a sharp circle of light in a black sky. * * * Rays of sunlight go straight through all kinds of gases. * * * The light that we call daylight is the light of the sun's rays reflected from the particles of dust in the air about our earth.

These and similar expressions show that the author is not quite up to date in his study of physics. Rays of light do not go straight through the atmosphere, but are bent in curves by atmospheric refraction, and our long twilights are partly due to the curvature of these rays. If dust is present in the air, the light reflected therefrom has various tints of gray or red, depending on the size and nature of the particles of dust, but if no dust is present, light may be reflected from any minute particles of water or ice that happen to be present, and these are not generally called dust. Molecules of water or ice sometimes form minute drops by gathering about particles of dust as nuclei, but they can also form such drops without dust as nuclei, and must frequently do so. However, if neither dust nor water were present in the atmosphere, we should still have our ordinary blue sky light, and some sunset sky colors. The deep blue of the sky is due almost entirely to the selective dispersion of the various waves or rays of light that come from the sun, by the action of the molecules of the constituent gases of the atmosphere. The ability of these molecules to absorb and reflect any given wave length depends upon the relative dimensions of the wave and the molecule. The exact relation has been carefully worked out by Lord Rayleigh, whose formulæ explain not only the blue color of the sky, but also the polarized condition of that light. Dust particles and ordinary water or ice particles are relatively so large that they reflect all rays of light, with a slight possible predominance of the red rays or long waves; consequently the hazy whites and grays of foggy weather and the dirty reds of the Indian summer may be attributed to dust and vapor, which in fact obscure the deep blue sky light.

Aqueous vapor in its finest condition, when it begins to condense without the help of dust nuclei, has the power of selectively reflecting the longer or bright blue as distinguished from the shorter dark blue of the pure upper sky; the resulting bluish haze may often be seen under favorable atmospheric conditions when we look at a distant landscape, and especially in the pure air of oceanic islands. The blue haze off the west coast of Scotland is proverbial. This haze was first studied in the laboratory by Tyndall, when he produced it unexpectedly by allowing dustless moist air to expand inside a vacuum tube.

The beautiful colored sunsets observed in connection with the eruption of Krakatoa, and especially the brilliant colors brought out by Prof. Carl Barus, of Brown University, in his study of cloudy condensation, are not due to dust nor to the selective reflection by fine particles, but are examples of a very different process, i. e., the colors of thin plates, or what Newton called the colors of thin films. The central portion of each little sphere of water transmits a minute beam of sunlight which has been reflected to and fro within the sphere, and its waves have interfered with each other. Some have been reinforced and others have been annulled. The former give the beam that is seen by the observer, and its color depends on the diameter of the sphere or the thickness of the film of water.

In general, therefore, our beautiful atmospheric colors are not altogether due to dust.

ADDENDUM.

Hawaii.—A rather wet November, except in leeward Maui and leeward Oahu. Mean temperatures approximately normal, although night temperatures were low at intervals. Cold, wet weather during middle portion of month retarded cane growth and field operations, especially in windward plantations; condition of cane in Kau, Hawaii, materially improved, however, by showers. Young pineapple plants in good condition all month, and ripening of winter fruit quite general by close of month. Second crop rice damaged by high winds and heavy rain during middle of month in northern Kauai, windward Oahu, and portions of windward Maui. Coffee picking in progress all month; indications of rather light yield in windward Hawaii, but above average in Kona, Hawaii. Most leeward pastures in need of rain all month.—*Alex. McC. Ashley.*

THE WEATHER OF THE MONTH.

By Mr. WM. B. STOCKMAN, Chief, Division of Meteorological Records.

PRESSURE.

The distribution of mean atmospheric pressure is graphically shown on Chart VIII and the average values and departures from normal are shown in Tables I and V.

The isobars of mean pressure for the month closely approach in contour those of the normal for the month of November, with an area of high pressure over the northwestern and another over the southeastern portion of the country and the area of lowest pressure over the southern Plateau region.

The mean pressure for the month was somewhat above the normal in the central and northern portions of Washington, northeastern Idaho, western Montana, northwestern Wyo-

ming, and the eastern portion of the southern Plateau region; elsewhere the mean pressure was below the normal.

The greatest positive departure from the normal was +.06 inch and covered but a small area of northwestern Montana. The maximum negative departure was —.11 inch in extreme northeastern Maine, while departures ranging from —.05 to —.10 inch occurred over New England, New York, upper Michigan, Wisconsin, except the extreme southern part, northern Iowa, Minnesota, North Dakota, eastern South Dakota, western Arkansas, and the extreme northeastern portion of Texas.

The mean pressure for the month increased over that of October, 1905, in the southern portion of the South Atlantic States, Florida Peninsula, east Gulf States, southern and central portions of the west Gulf States, the southern slope, southern Plateau, south Pacific and middle Pacific regions, except the extreme northwestern portion of the last-named district; elsewhere the mean pressure diminished from that of the preceding month.

The greatest increases ranged from +.05 to +.09 inch and occurred over Florida, except the extreme northeastern portion, extreme southeastern Louisiana, upper Rio Grande Valley, central and western New Mexico, extreme southwestern Colorado, and eastern and southern Arizona. The decrease ranged from —.05 to —.10 inch in the Middle Atlantic States, upper Ohio Valley, Lake region, northern portion of the upper Mississippi Valley, upper Missouri Valley, North Dakota, and the greater portions of the middle and northern slope and north Pacific regions, and from —.10 to —.16 inch over New England, except western Connecticut.

TEMPERATURE OF THE AIR.

The mean temperature for the month was below the normal in Maine, New Hampshire, Vermont, western Massachusetts, in the islands off the southern New England coast, New York, and Pennsylvania, except the extreme southeastern portions, southeastern New Jersey, western Maryland, the Virginias, except the extreme southeastern portion of old Virginia, central North Carolina, eastern Kentucky, Ohio, southeastern lower Michigan, the extreme western portions of the Plateau regions, the Pacific coast districts, except the extreme southwestern portion, and the southwestern portion of the northern slope region; elsewhere the mean of the month was above the normal.

The minus departures, as a rule, were small, in but a few cases exceeding —2°, while the plus departures were generally quite marked, in most cases exceeding +2°, and over the greater portion of the region between the Mississippi River and the Rocky Mountains exceeding +4°, with the maximum departures ranging from +6° to +8° over northeastern Nebraska, eastern and northern South Dakota, northeastern Montana, North Dakota, and extreme western Minnesota.

By geographic districts the mean temperature for the month was below the normal in New England, the Middle Atlantic States, lower Lake region, and the Plateau and Pacific coast regions; elsewhere it was above the normal. In the districts where the mean was below the normal the departures were slight, while in those where they were above the normal they were marked, in North Dakota amounting to +8.3°.

Maximum temperatures of 90°, or higher, were reported from portions of southwestern Arizona and the extreme southern portion of the Florida Peninsula; and of 80° to 90° from extreme southeastern North Carolina, eastern South Carolina, eastern and southern Georgia, Florida, except the extreme western portion, southwestern Mississippi, extreme southern Arkansas, Louisiana, southwestern Indian Territory, the upper Rio Grande Valley, and Texas, except the extreme northwestern portion, extreme southeastern New Mexico, southwestern Arizona, the southern third of California, and also in portions of the northern part of the Sacramento Valley. Maximum temperatures of 50° to 60° were reported from Maine, western Massachusetts, northern and western New York, northern lower Michigan, upper Michigan, northern Wisconsin, northeastern and northern Minnesota, in portions of the Rocky Mountain regions, and in eastern and south-central Washington. Over the remainder of the country the maximum temperatures ranged from 60° to 80°.

Freezing temperatures occurred as far south as southeastern South Carolina, central Georgia, southern Alabama, central Mississippi, northern Louisiana, central and southwestern Texas, and the southern border of New Mexico, in eastern and northern Arizona, and in interior California, except the extreme southern part.

Zero temperatures were reported from the northern portions of Maine, New Hampshire, and Vermont, portions of the mountain districts of New York, the extreme northern portion of lower Michigan, northern Wisconsin, Minnesota, northweestrn Iowa, northern Nebraska, the Dakotas, Montana, Wyoming, western Colorado, northeastern Arizona, south-central Utah, central Nevada, east-central California, and southeastern Idaho.

Minimum temperatures from 20° to 30° below zero occurred over the greater portions of Minnesota, North Dakota, and the northern slope region.

The average temperatures for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	8	38.8	— 0.7	—11.9	—1.1
Middle Atlantic	12	43.7	— 0.3	— 5.7	—0.5
South Atlantic	10	55.3	+ 1.2	— 0.3	0.0
Florida Peninsula*	8	68.3	+ 1.7	+ 7.1	+0.6
East Gulf	9	59.1	+ 3.1	— 2.4	—0.2
West Gulf	7	60.5	+ 4.1	— 0.7	—0.1
Ohio Valley and Tennessee	11	45.3	+ 0.6	— 6.8	—0.6
Lower Lake	8	38.0	— 1.1	— 9.7	—0.9
Upper Lake	10	34.8	+ 1.4	— 2.0	—0.2
North Dakota*	8	31.6	+ 8.3	+ 9.6	+0.9
Upper Mississippi Valley	11	40.2	+ 3.4	— 4.0	—0.4
Missouri Valley	11	42.4	+ 5.5	— 0.7	—0.1
Northern Slope	7	35.6	+ 2.9	+ 0.8	+0.1
Middle Slope	6	46.0	+ 4.7	— 2.7	—0.2
Southern Slope*	6	51.4	+ 1.9	— 9.2	—0.8
Southern Plateau*	13	46.8	— 0.5	— 5.4	—0.5
Middle Plateau*	8	37.3	— 0.1	+ 1.8	+0.2
Northern Plateau*	12	36.4	— 0.2	+ 9.2	+0.8
North Pacific	7	44.6	— 0.7	+ 7.7	+0.7
Middle Pacific	5	53.0	— 0.5	+ 8.3	+0.8
South Pacific	4	56.7	— 0.8	+ 5.1	+0.5

* Regular Weather Bureau and selected cooperative stations.

In Canada.—**Prof. R. F. Stupart says:**

The mean temperature of the month differed widely from the average in Manitoba and the Northwest Provinces, the departure being as much as 12° in excess over the northern portions of Alberta and Saskatchewan and lessening to an excess of about 6° in the more southern districts. On the lower mainland of British Columbia and Vancouver Island the departure was in excess of the average by 1° or 2°. From the Great Lakes to the Maritime Provinces differences from average were nowhere pronounced, averaging about 1° below over most of Ontario and Quebec and from 1° to 2° above in the Maritime Provinces.

PRECIPITATION.

The distribution of total monthly precipitation is shown on Chart III.

The precipitation was below the normal in the Atlantic and Gulf States, Ohio Valley and Tennessee, Lake region, North Dakota, and the northern Plateau and north and middle Pacific regions; elsewhere it was above normal.

Precipitation far in excess of the normal occurred over the

greater portion of the southern Rocky Mountain and southern Plateau regions.

It was especially heavy over the greater part of Arizona, where phenomenal amounts for the season were recorded. At Prescott the fall for the month was the greatest in a period of 35 years, and it is probable that in no previous November since records have been kept was the precipitation, both rain and snow, so generally heavy and well distributed over that section.

The total depth and the southern limit of snowfall are depicted on Chart X, and the depth of snow on ground at end of month on Chart XI.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	8	2.65	69	−1.2	−6.2
Middle Atlantic	12	1.11	37	−1.9	−3.3
South Atlantic	10	0.87	30	−2.0	−9.3
Florida Peninsula*	8	0.91	41	−1.3	+1.8
East Gulf	9	2.45	64	−1.4	+1.3
West Gulf	7	3.85	97	−0.1	+2.0
Ohio Valley and Tennessee	11	2.28	62	−1.4	−2.2
Lower Lake	8	2.52	81	−0.6	−1.8
Upper Lake	10	2.16	84	−0.4	+0.4
North Dakota*	8	1.38	66	−0.7	+0.6
Upper Mississippi Valley	11	2.30	110	+0.2	+0.1
Missouri Valley	11	1.92	157	+0.7	+6.6
Northern Slope	7	0.72	138	+0.2	+3.0
Middle Slope	6	1.60	160	+0.6	+5.1
Southern Slope*	6	3.18	201	+1.6	+7.9
Southern Plateau*	13	3.06	546	+2.5	+8.0
Middle Plateau*	8	1.15	153	+0.4	+1.5
Northern Plateau*	12	1.12	62	−0.7	−2.1
North Pacific	7	3.23	47	−3.7	−9.9
Middle Pacific	5	1.99	59	−1.4	−5.8
South Pacific	4	2.32	176	+1.0	+3.5

*Regular Weather Bureau and selected cooperative stations.

In Canada.—Professor Stupart says:

The precipitation in Vancouver Island and all the western portions of British Columbia was very light, being but a small fraction of the average. Farther east, however, at the higher levels it was average or a little in excess, and this was also the case in western Alberta. From eastern Alberta to western Manitoba, where it was mostly in the form of snow, there was a general deficiency, but to the eastward of this again as far as the neighborhood of Lake Huron there was an excess. * * * In the western portions of the Peninsula of Ontario, where it was part rain and part snow, it was nearly average, but in the more northern and eastern districts it was deficient, the largest departures occurring in the Ottawa Valley. In Quebec there was a very general small deficiency, while in the Maritime Provinces the precipitation, mostly in the form of rain, was very nearly average.

At the close of the month there was a light covering of snow over the more northern and eastern portions of the Northwest Provinces and also over most of northern Ontario, while in other parts of the Dominion the ground was either bare or nearly so.

CLEAR SKY AND CLOUDINESS.

Average cloudiness obtained in the Middle and South Atlantic States and middle slope and north Pacific districts; the cloudiness was below the normal in New England, Florida Peninsula, Ohio Valley and Tennessee, Lake region, upper Mississippi and Missouri valleys, and the northern Plateau region; elsewhere it was above the normal.

The distribution of clear sky is graphically shown on Chart IV, and the numerical values of average daylight cloudiness, both for individual stations and by geographic districts, appear in Table I.

The averages for the various districts, with departures from the normal, are shown in the following table:

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.2	− 0.4	Missouri Valley	4.4	− 0.5
Middle Atlantic	5.2	0.0	Northern Slope	5.0	+ 0.4
South Atlantic	4.5	0.0	Middle Slope	3.6	0.0
Florida Peninsula	3.9	− 0.7	Southern Slope	5.1	+ 1.9
East Gulf	5.2	+ 0.7	Southern Plateau	4.4	+ 2.1
West Gulf	5.8	+ 1.2	Middle Plateau	4.2	+ 0.6
Ohio Valley and Tennessee	5.1	− 0.6	Northern Plateau	5.1	− 0.9
Lower Lake	6.7	− 0.5	North Pacific	6.8	0.0
Upper Lake	6.8	− 0.2	Middle Pacific	4.0	+ 0.2
North Dakota	5.8	+ 0.5	South Pacific	3.6	+ 0.7
Upper Mississippi Valley	4.8	− 0.5			

HUMIDITY.

The average relative humidity was normal in the Florida Peninsula and the south Pacific region; above the normal in the Gulf States, upper Mississippi Valley, the slope and middle and southern Plateau and north Pacific regions; elsewhere it was below the normal.

The minus departures were quite marked in the Atlantic districts north of Florida, and the middle Pacific region, while the plus departures were very marked in the southern slope and southern Plateau regions.

The averages by districts appear in the following table:

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	70	− 8	Missouri Valley	69	− 2
Middle Atlantic	68	− 7	Northern Slope	71	+ 4
South Atlantic	73	− 5	Middle Slope	66	+ 4
Florida Peninsula	80	0	Southern Slope	74	+12
East Gulf	78	+ 2	Southern Plateau	71	+28
West Gulf	76	+ 2	Middle Plateau	64	+ 6
Ohio Valley and Tennessee	71	− 2	Northern Plateau	69	− 5
Lower Lake	75	− 2	North Pacific	86	+ 2
Upper Lake	78	− 2	Middle Pacific	63	−12
North Dakota	76	− 3	South Pacific	67	0
Upper Mississippi Valley	76	+ 2			

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Amarillo, Tex	23	50	sw.	Mount Tamalpais, Cal	20	60	nw.
Block Island, R. I	29	60	sw.	Do	21	60	n.
Do	30	54	nw.	Do	26	57	nw.
Buffalo, N. Y	1	63	w.	Mount Weather, Va	6	60	nw.
Do	6	62	sw.	Do	16	51	nw.
Do	24	55	sw.	Do	30	59	nw.
Do	25	58	sw.	Nantucket, Mass	29	52	sw.
Do	29	55	w.	North Head, Wash	18	72	se.
Cheyenne, Wyo	24	52	w.	Peoria, Ill	24	50	w.
Chicago, Ill	24	52	sw.	Port Huron, Mich	24	52	w.
Cleveland, Ohio	6	54	w.	Santa Fe, N. Mex	22	51	se.
Do	29	50	w.	Sioux City, Iowa	24	54	nw.
Devils Lake, N. Dak	27	50	ne.	Syracuse, N. Y	15	50	s.
Do	28	60	n.	Do	28	63	s.
Duluth, Minn	24	70	nw.	Tatoosh Island, Wash	2	50	s.
Do	27	62	ne.	Do	8	52	e.
Do	28	68	ne.	Do	17	60	w.
Grand Rapids, Mich	24	60	sw.	Do	18	60	s.
Mount Tamalpais, Cal	4	60	n.	Do	28	52	e.
Do	5	64	ne.	Do	29	53	e.

DESCRIPTION OF TABLES AND CHARTS.

By Mr. WM. B. STOCKMAN, Chief, Division of Meteorological Records.

For description of tables and charts see page 20 of REVIEW for January, 1905.

TABLE I.—*Climatological data for U. S. Weather Bureau stations, November, 1905.*

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.												Precipitation, in inches.			Wind.									
																								Maximum velocity.							
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.	Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Miles per hour.	Direction.	Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
New England.							38.8	-0.7										70	2.65	-1.2										5.2	
Eastport	76	69	82	29.82	29.90	-.11	36.4	-0.3	56	25	43	7	30	30	37	34	29	76	4.29	0.0	13	9,518	nw.	36	nw.	30	6	8	16	7.0	3.5
Portland, Me.	103	81	117	29.83	29.96	-.08	36.8	-1.2	60	25	45	12	30	29	31	33	27	70	4.45	+0.4	11	6,760	nw.	36	nw.	30	10	12	8	4.9	0.4
Concord	288	70	79	29.65	29.97	-.09	35.5	-1.8	66	24	45	7	15	26	36	...	...	...	2.33	-1.1	10	4,132	nw.	27	nw.	30	8	11	11	5.4	T.
Northfield	876	16	60	29.02	29.99	-.06	31.2	-1.7	60	24	40	4	14	22	38	28	24	76	1.73	-1.4	11	6,302	s.	42	se.	15	5	7	18	7.0	9.2
Boston	125	115	181	29.84	29.98	-.07	41.6	+1.0	64	24	50	13	30	33	34	36	29	65	1.77	-2.8	6	7,961	w.	36	nw.	17	13	8	9	4.3	T.
Nantucket	12	14	90	29.97	29.98	-.07	44.0	-0.7	61	1	50	19	30	38	31	40	35	72	2.82	-0.7	10	11,906	nw.	52	sw.	29	9	15	6	5.0	T.
Block Island	26	11	46	29.97	30.00	-.06	43.2	-1.7	58	1	49	18	30	37	33	40	35	72	2.28	-1.9	7	14,482	nw.	60	sw.	29	10	12	8	4.9	
Providence	159	57	67	29.83	30.01	-.06	41.0	......	64	1	50	14	30	32	30	35	28	65	1.57	......	7	5,257	w.	29	w.	27	14	10	6	4.2	T.
Hartford	159	115	132	29.84	30.02	-.06	39.8	......	61	1	49	14	30	30	29	34	28	65	1.77	......	6	5,486	nw.	31	s.	15	12	9	9	4.7	T.
New Haven	106	116	154	29.90	30.02	-.05	41.6	+0.5	63	25	51	11	30	32	36	36	30	67	1.53	-2.4	7	7,080	nw.	35	w.	30	16	7	7	4.1	T.
Mid. Atlantic States.							43.7	-0.3										68	1.11	-1.9										5.2	
Albany	97	102	115	29.92	30.03	-.05	37.6	-1.6	59	24	46	13	30	29	33	33	28	72	1.49	-1.5	10	5,703	s.	36	s.	15	6	10	14	6.6	0.4
Binghamton	875	79	90	29.06	30.01	-.08	36.2	-1.8	63	24	45	12	14	27	33	...	...	...	1.29	-1.0	8	4,780	w.	31	w.	1	4	5	21	7.6	1.4
New York	314	108	350	29.69	30.04	-.05	43.8	+0.4	63	29	51	19	30	37	31	38	32	67	1.67	-2.1	6	10,271	nw.	48	w.	1	11	13	6	4.9	T.
Harrisburg	374	94	104	29.67	30.08	-.03	41.1	-1.3	66	12	49	20	14	33	28	36	29	66	1.51	-1.3	8	5,194	nw.	31	nw.	30	13	8	9	4.9	T.
Philadelphia	117	116	184	29.94	30.07	-.03	45.2	+1.3	66	29	53	21	30	37	29	38	30	59	1.61	-1.6	6	7,908	nw.	38	nw.	29	12	10	8	4.7	T.
Scranton	805	111	119	29.16	30.05	-.04	38.0	......	61	24	47	14	14	29	31	34	29	73	1.56	......	8	5,727	sw.	34	sw.	15	8	16	6	5.0	1.0
Atlantic City	52	39	48	30.01	30.08	-.02	44.3	-0.4	66	6	53	20	30	36	30	39	33	69	1.01	-2.5	5	6,008	nw.	28	sw.	29	11	6	13	5.6	T.
Cape May	17	48	52	30.08	30.10	.00	45.7	-0.9	64	6	52	23	30	39	27	41	...	...	0.54	-2.8	4	6,929	nw.	35	nw.	30	10	13	7	4.6	T.
Baltimore	123	69	117	29.94	30.08	-.03	45.8	+0.4	71	29	54	24	14	37	34	38	29	58	1.35	-1.7	6	5,477	nw.	34	nw.	29	11	7	12	5.2	
Washington	112	59	76	29.95	30.07	-.05	44.4	-0.1	73	29	54	20	15	34	39	37	31	68	1.03	-1.8	7	4,844	nw.	36	nw.	30	12	5	13	5.4	0.1
Lynchburg	681	83	88	29.34	30.10	-.03	46.2	-0.1	74	6	58	19	15	35	40	39	34	72	0.45	-2.5	8	3,011	nw.	24	nw.	16	13	14	3	4.6	T.
Mount Weather	1,725	10	57	28.21	30.09	-.03	39.8	......	64	29	47	16	30	32	27	33	26	63	0.82	......	8	12,621	nw.	60	nw.	6	12	8	10	5.1	0.7
Norfolk	91	102	111	30.00	30.10	-.01	51.4	+1.1	74	29	59	31	30	44	28	45	40	70	0.90	-2.2	9	6,695	n.	32	sw.	6	14	7	9	4.5	0.4
Richmond	144	145	153	29.94	30.10	-.02	48.2	......	74	29	59	21	15	38	38	...	...	...	0.51	......	7	6,421	s.	46	s.	29	15	11	4	4.2	T.
Wytheville	2,293	40	47	27.68	30.11	-.02	43.0	-0.1	67	29	54	15	22	32	42	36	32	75	0.44	-1.8	6	4,534	w.	27	nw.	16	14	5	11	4.8	T.
S. Atlantic States.							55.3	+1.2										73	0.87	-2.0										4.5	
Asheville	2,255	53	75	27.73	30.13	-.01	46.0	-0.4	69	18	57	20	22	35	39	39	34	68	0.26	-2.4	5	6,120	nw.	30	nw.	30	14	6	10	4.6	
Charlotte	773	68	76	29.27	30.12	-.01	51.4	+1.5	73	18	61	26	15	41	35	43	36	63	0.57	-2.5	3	5,194	sw.	38	sw.	29	10	11	9	5.0	
Hatteras	11	12	47	30.07	30.08	-.03	56.6	+1.0	75	29	63	38	30	50	30	52	49	79	0.80	-4.4	7	11,349	ne.	47	nw.	16	17	3	10	4.4	
Raleigh	376	71	79	29.70	30.11	-.02	50.8	+1.2	75	29	61	23	15	40	33	43	37	65	0.66	-1.5	5	4,746	n.	27	sw.	29	14	5	11	4.8	T.
Wilmington	78	82	90	30.00	30.08	-.04	54.8	+0.2	77	29	65	28	15	44	33	48	45	78	0.78	-1.7	4	5,739	n.	29	sw.	29	15	8	7	4.1	
Charleston	48	14	92	30.05	30.10	-.04	58.8	+1.2	77	7	67	35	22	50	26	52	49	78	0.94	-2.1	3	7,872	n.	35	ne.	14	14	11	5	3.9	
Columbia, S. C.	351	41	57	29.72	30.11	-.01	55.2	+0.4	79	29	66	30	15	44	34	47	41	68	1.30	-1.0	5	5,195	sw.	36	sw.	29	13	10	7	4.5	
Augusta	180	89	97	29.91	30.11	-.02	55.8	+2.4	80	29	67	32	22	44	37	48	44	73	1.53	-1.5	3	4,644	nw.	34	sw.	29	15	9	6	4.1	
Savannah	65	81	89	30.03	30.10	-.02	59.6	+1.8	80	6	69	34	22	50	29	52	48	76	1.26	-1.0	2	5,419	n.	24	w.	16	13	8	9	4.6	
Jacksonville	43	101	129	30.02	30.07	-.03	63.8	+2.4	81	6	72	45	12	55	25	57	54	81	0.60	-1.9	4	6,177	ne.	32	n.	10	11	13	6	4.7	
Florida Peninsula.							72.1	+0.9										80	1.11	-1.2										3.9	
Jupiter	28	10	48	30.00	30.02	-.03	72.6	+0.8	86	10	79	57	15	66	21	67	65	81	2.88	0.0	9	7,824	ne.	34	e.	22	10	17	3	4.5	
Key West	22	10	53	29.99	30.01	-.03	75.8	+1.6	85	10	80	67	26	72	13	69	67	79	0.20	-2.1	3	6,285	ne.	29	nw.	16	16	8	6	4.0	
Tampa	34	79	96	30.01	30.05	-.03	67.8	+0.4	83	20	77	53	3	59	25	61	58	81	0.26	-1.5	1	5,090	ne.	23	ne.	11	19	4	7	3.3	
East Gulf States.							59.1	+3.1										78	2.45	-1.4										5.2	
Atlanta	1,174	190	216	28.86	30.12	-.01	53.2	+1.4	72	19	62	26	30	44	29	46	41	69	1.98	-1.6	9	9,330	nw.	44	w.	16	14	7	9	4.4	
Macon	370	55	66	29.71	30.12	-.01	56.1	......	77	29	67	31	23	45	36	...	...	...	1.66	......	4	3,285	ne.	20	sw.	29	13	8	9	4.8	
Pensacola	56	79	96	30.04	30.10	-.01	62.3	+3.1	77	5	69	43	12	56	21	...	...	...	1.70	-2.1	6	6,699	ne.	39	e.	10	10	7	13	5.3	
Birmingham	700	136	143	29.33	30.11	-.01	55.7	+1.4	74	5	64	24	30	47	34	...	...	...	2.21	-1.6	8	6,090	sw.	28	n.	29	8	10	12	5.5	
Mobile	57	87	96	30.03	30.09	-.02	61.7	+3.8	79	29	69	41	12	54	23	56	54	82	3.24	-0.6	6	3,981	n.	19	n.	30	10	7	13	5.2	
Montgomery	223	100	112	29.86	30.12	.00	58.0	+2.8	79	5	68	32	30	48	33	51	47	78	1.73	-1.6	5	4,617	ne.	27	nw.	29	15	8	7	4.1	
Meridian	375	84	93	29.70	30.10	-.02	56.8	+3.4	78	5	67	28	30	47	36	...	...	...	1.39	-1.7	10	4,030	sw.	30	e.	9	10	6	14	5.7	
Vicksburg	247	62	74	29.80	30.08	-.04	60.0	+4.6	80	5	68	31	30	52	31	54	51	77	3.71	-1.1	9	4,944	n.	34	nw.	29	11	6	13	5.4	
New Orleans	51	88	121	30.02	30.08	-.02	65.0	+4.3	82	29	72	45	30	58	23	59	57	83	3.62	-0.6	10	6,263	n.	28	n.	29	9	7	14	6.0	
West Gulf States.							60.5	+4.1										76	3.85	-0.1										5.8	
Shreveport	249	77	84	29.82	30.09	-.02	59.2	+4.6	80	27	68	29	30	50	38	53	49	75	2.93	-1.8	9	5,066	s.	33	e.	9	12	5	13	5.3	
Fort Smith	457	79	94	29.58	30.06	-.05	53.5	+4.2	79	28	64	21	30	42	36	46	41	69	2.09	-1.6	4	6,026	e.	33	nw.	29	12	11	7	4.2	
Little Rock	357	93	100	29.71	30.09	-.03	54.8	+4.0	78	5	64	24	30	45	39	48	43	70	5.72	+0.4	9	5,238	nw.	30	nw.	29	15	3	12	5.2	
Corpus Christi	20	48	53	30.02	30.04	-.03	66.8	+3.8	84	28	72	46	30	61	24	63	61	86	3.23	+0.2	10	6,998	se.	30	n.	19	5	6	19	7.1	
Fort Worth	670	106	114	29.35	30.06	-.04	58.3	......	83	26	69	23	30	48	39	...	...	...	3.19	......	5	6,845	sw.	36	s.	27	11	14	5	4.7	
Galveston	54	106	112	30.01	30.07	-.02	65.1	+2.7	78	5	70	42	30	60	20	62	61	88	5.77	+1.4	10	8,043	n.	44	nw.	29	7	9	14	6.0	
Palestine	510	73	79	29.52	30.06	-.05	60.4	+4.2	82	27	69	30	30	52	37	53	49	72	4.56	+0.1	8	5,725	sw.	31	ne.	9	10	4	16	6.3	
San Antonio	701	80	91	29.31	30.04	-.04	63.9	+4.9	86	26	72	40	30	56	32	57	53	74	2.63	+0.5	10	4,772	n.	35	n.	29	6	4	20	7.0	
Taylor	583	55	63	29.43	30.04	-.04	61.8	......	86	26	71	33	30	53	35	...	...	...	3.74	......	7	5,690	n.	31	n.	29	8	5	17	6.5	
Ohio Val. and Tenn.							45.3	+0.6										71	2.28	-1.4										5.1	
Chattanooga	762	106	112	29.31	30.13	-.01	51.6	+1.7	74	18	61	25	30	42	40	45	40	70	0.87	-2.9	7	4,947	nw.	35	nw.	16	14	7	9	4.7	
Knoxville	1,004	35	88	29.04	30.11	-.02	48.9	+2.3	72	29	59	24	30	38	42	43	37	71	1.27	-2.5	7	5,498	sw.	44	sw.	29	10	10	10	5.2	T.
Memphis	399	76	97	29.69	30.12	.00	54.8	+4.9	75	18	63	22	30	46	45	48	43	70	2.18	-2.5	6	6,672	sw.	44	nw.	29	16	6	8	4.4	
Nashville	546	79	91	29.54	30.13	+.01	50.6	+2.6	74	18	62	24	30	40	42	43	37	67	1.35	-2.5	5	4,767	nw.	32	s.	28	11	10	9	4.5	T.
Lexington	989	75	102	29.01	30.10	-.02	43.7	-0.8	69	18	52	20	30	35	38	...	...	...	3.58	-0.1	9	8,868	sw.	46	s.	28	12	8	10	4.8	T.
Louisville	525	114	136	29.52	30.12	.00	46.2	+0.9	71	18	56	22	30	37	43	40	34	67	5.16	+1.1	8	6,975	sw.	33	sw.	28	12	7	11	5.1	T.
Evansville	431	72	82	29.61	30.09	-.03	47.1	......	71	18	56	20	30	38	36	...	...	...	3.74	......	7	5,989	sw.	34	s.	28	11	13	6	4.5	T.
Indianapolis	822	154	164	29.18	30.08	-.02	41.6	+0.7	68	28	51	19	30	32	35	36	31	71	1.48	-2.4	5	8,007	sw.	45	sw.	24	12	11	7	4.7	T.
Cincinnati	628	152	160	29.41	30.10	-.02	43.9	0.0	66	28	53	23	30	35	38	38	31	66	2.75	-0.6	8	5,718	sw.	30	n.	13	12	7	11	5.0	T.
Columbus	824	173	190	29.19	30.08	-.03	40.6	-0.6	64	28	49	19	30	32	35	36	33	80	1.64	-1.6	10	9,650	sw.	47	w.	29	14	6	10	4.8	T.
Pittsburg	842	336	352	29.16	30.08	-.02	40.4	-2.4	61	28	48	18	14	33	33	36	30	69	1.80	-0.7	12	8,243	sw.	49	w.	6	8	9	13	6.0	T
Parkersburg	638	77	84	29.44	30.11	-.01	42.0	-2.0	66	28	51	20	30	33	30	36	31	72	3.01	0.0	10	4,725	nw.	30	nw.	29	7	7	16	6.9	T.
Elkins	1,940	41	50	28.01	30.13	+.01	39.0	-0.4	63	18	50	12	30	28	42	33	29	78	2.30	-1.6	16	3,412	w.	24	s.	28	8	10	12	5.7	0.1
Lower Lake Region.							38.0	-1.1										75	2.52	-0.6										6.7	
Buffalo	767	178	206	29.16	30.00	-.05	37.4	-0.8	57	29	43	14	30	31	30	34	30	76	2.44	-1.1	15	13,780	w.	63	w.	1	2	14	14	7.2	2.0
Oswego	335	76	91	29.62	30.00	-.05	36.7	-1.8	60	24	43	13	30	30	26	34	29	75	2.53	-0.8	18	9,548	nw.	38	w.	6	3	6	21	7.9	7.7
Rochester	523	81	102	29.44	30.02	-.03	37.0	-0.4	60	24	44	10	14	30	30	33	29	75	1.43	-1.4	18	7,621	sw.	38	sw.	24	1	8	21	7.9	4.0
Syracuse	597	97	113	29.34	30.00	-.06	36.4	......	60	24	43	12	30	30	32	...	...	...	1.19	......	15	10,030	s.	63	s.	28	3	12	15	6.7	4.0
Erie	713	92	102	29.24	30.02	-.04	38.8	-2.2	61	29	45	18	14	32	34	34	28	67	2.51	-1.6	16	10,129	sw.	47	s.	28	6	7	17	7.1	0.6
Cleveland	762	190	201	29.20	30.04	-.03	38.8	-0.9	63	28	45	19	30	32	36	35	32	78	2.85	0.0	16	13,226	sw.	54	w.	6	7	8	15	6.4	4.6
Sandusky	629	62	70	29.34	30.03	-.05	39.6	-0.8	63	28	47	21	30	32	37	...	...	...	2.38	-0.7	10	7,411	sw.	37	w.	29	9	9	12	5.4	0.3
Toledo	628	120	127	29.36	30.06	-.01	38.2	-1.0	67	28	46	17	30	30	35	34	29	75	3.27	+0.4	11	8,583	w.	40	s.	24	9	10	11	5.5	0.3
Detroit	730	153	193	29.23	30.04	-.02	37.5	-0.6	61	28	45	15	30	30	37	34	31	82	2.76	+0.1	9	9,557	sw.	46	sw.	24	8	9	13	5.9	0.3
Upper Lake Region.							34.8	+1.4										78	2.16	-0.4										6.8	
Alpena	609	13	92	29.29	29.97	-.04	33.8	+1.0	60	11	40	5	30	27	28	30	27	80	1.98	-0.8	15	8,618	nw.	46	se.	28	3	9	18	7.8	5.2
Escanaba	612	40	48	29.30	29.98	-.05	33.4	+2.2	63	11	40	10	30	26	31	30	26	79	2.49	+0.2	11	6,121	nw.	37	ne.	13	3	13	14	6.8	15.5
Grand Rapids	707	127	165	29.24	30.02	-.02	36.8	-0.8	67	28	44	15	30	30	34	33	30	82	2.30	-1.2	10	9,214	nw.	60	sw.	24	7	9	14	6.6	0.1
Houghton	668	66	74	29.18	29.93	-.09	33.2	......	56	23	39	6	30	28	25	...	...	...	3.75	......	21	4,868	nw.	38	e.	28	4	5	21	7.9	21.8
Marquette	734	76	116	29.14	29.96	-.06	34.0	+2.6	58	11	40	14	30	28	26	30	27	78	2.53	-0.2	21	8,928	w.	45	e.	28	1	11	18	7.6	20.6
Port Huron	638	70	120	29.31	30.02	-.03	35.8	-0.6	60	28	44	12	30	28	38	32	29	80	2.62	-0.2	8	9,758	sw.	52	w.	24	5	11	14	6.8	0.2
Sault Ste. Marie	614	40	61	29.25	29.96	-.05	31.2	+0.9	53	24	36	-6	30	26	26	30	27	84	2.14	-0.4	18	7,143	nw.	46	nw.	24	1	1	28	9.3	17.2
Chicago	823	140	310	29.14	30.05	-.02	40.6	+2.2	69	28	48	14	30	34	31	37	33	76	2.05	-0.7	9	13,014	w.	52	sw.	24	10	9	11	5.4	T.
Milwaukee	681	124	142	29.28	30.04	-.01	37.8	+2.6	62	28	45	12	30	31	27	34	29	73	1.34	-0.7	9	7,734	w.	49	se.	28	10	6	14	5.5	3.1
Green Bay	617	49	86	29.31	29.98	-.06	34.5	+2.4	60	11	42	9	30	27	25	31	27	77	1.70	-0.4	9	7,926	sw.	46	sw.	24	6	8	16	6.8	5.6
Duluth	1,133	11	47	28.71	29.96	-.08	30.4	+1.7	59	11	38	-13	30	23	28	27	24	81	2.49	+0.9	9	10,340	w.	70	nw.	24	6	11	13	6.5	9.8

TABLE I.—*Climatological data for U. S. Weather Bureau stations, November, 1905*—Continued.

Stations.	Elevation of instruments: Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Pressure, in inches: Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Temperature of the air, in degrees Fahrenheit: Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.	Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches: Total.	Departure from normal.	Days with .01, or more.	Wind: Total movement, miles.	Prevailing direction.	Maximum velocity: Miles per hour.	Direction.	Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
North Dakota.							32.4	+ 7.0										76	1.33	+ 0.6										5.8	
Moorhead	935	8	57	28.96	30.01	− .06	31.8	+ 7.6	62	16	42	−27	30	21	38	27	25	84	2.32	+ 1.4	9	6,764	sw.	36	nw.	24	7	13	10	5.6	16.2
Bismarck	1,674	16	57	28.19	30.02	− .05	33.4	+ 7.5	70	16	44	−15	30	23	37	28	23	71	1.36	+ 0.7	7	8,035	nw.	45	n.	29	9	10	11	5.8	8.9
Devils Lake	1,482	11	44	28.37	30.00	− .06	28.8	......	62	10	39	−21	29	18	37	24	20	77	1.15	......	7	9,961	w.	60	n.	28	8	8	14	5.9	8.1
Williston	1,875	14	44	27.97	30.00	− .06	32.0	+ 5.9	64	16	43	−24	29	21	34	27	22	73	0.31	− 0.2	7	7,093	nw.	38	e.	27	11	6	13	5.9	3.6
Upper Miss. Valley.							40.2	+ 3.4										76	2.30	+ 0.2										4.8	
Minneapolis	......	102	208	......	......	......	35.2	+ 5.5	61	11	43	− 8	30	27	28	....	....	....	3.07	+ 2.4	6	9,517	nw.	48	nw.	24	9	10	11	6.0	11.5
St. Paul	837	171	179	29.05	29.98	− .08	35.5	+ 5.6	59	12	44	− 8	30	27	28	32	28	76	2.47	+ 1.4	7	8,010	nw.	44	nw.	15	5	12	13	6.6	6.7
La Crosse	714	71	87	29.20	29.99	− .08	37.0	+ 3.6	63	11	45	2	30	29	27	....	....	....	2.47	+ 1.0	8	6,206	s.	32	n.	29	10	6	14	6.2	3.0
Madison	974	70	78	28.94	30.02	− .04	35.9	+ 1.5	59	11	44	8	30	28	29	32	27	75	2.23	+ 0.5	9	8,488	sw.	46	ne.	13	13	7	10	4.8	3.4
Charles City	1,015	8	58	28.91	30.02	− .06	35.7	+ 2.7	64	11	46	0	30	25	36	31	28	83	2.08	+ 0.6	7	6,668	nw.	36	nw.	24	10	10	10	5.1	T.
Davenport	606	71	79	29.37	30.05	− .03	39.7	+ 2.9	62	28	49	10	30	31	35	35	30	73	2.01	0.0	6	6,496	nw.	34	nw.	24	15	6	9	4.0	T.
Des Moines	861	84	101	29.13	30.06	− .02	40.0	+ 3.6	64	12	50	3	30	30	46	34	29	72	2.34	+ 0.6	5	6,562	w.	36	sw.	28	11	11	8	4.9	0.1
Dubuque	698	100	117	29.28	30.05	− .02	38.4	+ 3.4	62	11	47	7	30	30	31	33	29	76	2.64	+ 0.5	7	5,552	nw.	28	s.	23	16	4	10	4.7	T.
Keokuk	614	63	78	29.38	30.07	− .02	42.8	+ 4.0	68	*	52	8	30	33	32	36	32	76	2.32	+ 0.2	7	6,792	sw.	36	sw.	24	17	5	8	3.7	T.
Cairo	356	87	93	29.71	30.10	− .02	49.8	+ 3.6	75	18	60	21	30	40	47	43	39	73	3.64	− 0.6	8	6,768	sw.	38	sw.	28	11	10	9	5.2	T.
La Salle	536	56	64	29.46	30.05	− .03	39.3	......	69	28	49	12	30	30	38	....	....	....	1.93	......	6	7,269	w.	42	sw.	24	15	6	9	4.7	T.
Peoria	609	11	45	29.38	30.06	− .03	39.9	......	72	28	51	11	30	29	39	....	....	....	2.45	......	6	7,934	w.	50	w.	24	17	6	7	3.5	T.
Springfield, Ill	644	82	93	29.37	30.07	− .03	42.8	+ 1.9	76	28	53	12	30	33	34	38	34	79	1.60	− 1.4	8	7,838	sw.	37	sw.	24	14	6	10	4.4	T.
Hannibal	534	75	109	29.48	30.07	− .02	43.6	+ 3.4	73	28	54	12	30	33	37	....	....	....	1.84	− 0.7	6	8,367	sw.	47	sw.	5	14	8	8	4.2	T.
St. Louis	567	208	217	29.45	30.07	− .03	46.6	+ 3.0	77	28	55	15	30	38	32	42	37	73	1.63	− 1.5	6	8,811	w.	39	w.	5	14	6	10	4.2	T.
Missouri Valley.							42.4	+ 5.5										69	1.92	+ 0.7										4.4	
Columbia, Mo	784	11	84	29.22	30.07	− .02	45.4	+ 2.4	74	28	56	11	30	35	38	....	....	....	1.40	− 0.9	6	7,119	sw.	42	sw.	5	18	6	6	3.3	T.
Kansas City	963	78	95	29.04	30.09	.00	46.8	+ 6.1	71	17	56	9	30	38	38	40	34	69	1.94	− 0.2	6	5,966	sw.	30	se.	27	16	9	5	3.4	T.
Springfield, Mo	1,324	98	104	28.65	30.07	− .03	48.1	+ 4.6	74	17	58	10	30	38	30	41	35	66	1.18	− 1.9	6	8,258	se.	38	se.	23	18	5	7	3.4	
Topeka	......	85	89	......	......	......	45.8	+ 4.6	71	13	57	9	30	35	41	....	....	....	1.80	+ 0.7	5	6,514	w.	35	sw.	28	17	7	6	3.4	T.
Lincoln	1,189	75	84	28.74	30.04	− .04	42.6	+ 4.5	66	15	53	4	30	32	37	36	31	71	2.52	+ 1.8	4	8,316	s.	46	nw.	29	15	6	9	4.3	T.
Omaha	1,105	115	121	28.84	30.05	− .03	42.6	+ 6.0	65	15	52	4	30	34	43	36	29	66	2.72	+ 1.7	4	6,929	sw.	36	nw.	29	11	7	12	5.0	T.
Valentine	2,598	47	54	27.27	30.04	− .04	39.0	+ 4.7	72	14	52	− 4	29	26	45	32	27	71	1.35	+ 0.9	4	8,131	nw.	48	nw.	23	13	13	4	4.4	5.3
Sioux City	1,135	96	164	28.79	30.03	− .05	39.6	+ 5.3	67	11	49	− 5	30	30	33	....	....	....	4.16	+ 3.3	7	9,983	nw.	54	nw.	24	13	7	10	5.0	1.0
Pierre	1,572	43	50	28.33	30.03	− .05	39.8	+ 7.9	72	16	51	−10	30	29	44	32	26	67	0.62	+ 0.2	4	5,472	se.	30	nw.	29	11	9	10	5.1	5.2
Huron	1,306	56	67	28.60	30.02	− .06	36.2	+ 6.7	71	16	48	−14	30	24	44	30	25	73	1.11	+ 0.5	5	8,473	nw.	44	se.	20	12	10	8	5.0	2.2
Yankton	1,233	55	65	28.69	30.03	− .05	40.0	+ 7.2	69	16	51	− 7	30	29	39	....	....	....	2.37	+ 1.7	7	7,258	w.	36	nw.	29	8	6	16	6.2	3.5
Northern Slope.							35.6	+ 2.9										71	0.72	+ 0.2										5.0	
Havre	2,505	11	44	27.32	30.01	− .02	34.0	+ 4.1	68	12	46	−28	29	22	36	29	24	71	0.60	0.0	4	7,300	w.	36	sw.	1	10	8	12	5.8	6.0
Miles City	2,371	26	48	27.47	30.07	.00	37.4	+ 6.1	67	*	48	−10	29	27	38	30	24	67	0.49	+ 0.1	6	4,507	w.	31	w.	14	12	7	11	4.8	4.7
Helena	4,110	8	56	25.83	30.13	+ .03	32.4	+ 0.9	60	15	41	−13	29	24	32	27	21	67	0.97	+ 0.3	6	4,403	w.	34	w.	24	12	7	11	5.2	11.0
Kalispell	2,962	11	34	26.99	30.13	+ .06	31.4	......	55	15	39	− 4	29	24	27	28	26	85	1.44	......	8	2,729	nw.	25	w.	3	5	6	19	7.5	14.2
Rapid City	3,234	46	50	26.58	30.07	− .01	38.2	+ 3.3	70	14	50	− 5	29	26	44	31	26	72	0.40	0.0	3	5,671	w.	36	se.	30	13	8	9	4.4	4.0
Cheyenne	6,088	56	64	23.97	30.04	− .03	37.0	+ 2.8	66	14	48	0	28	26	40	30	23	64	0.11	− 0.2	2	7,376	nw.	52	w.	24	13	10	7	4.3	1.1
Lander	5,372	26	36	24.64	30.14	+ .04	29.6	− 2.0	60	14	43	−19	29	17	40	24	21	78	1.82	+ 1.2	7	1,633	sw.	15	se.	23	10	12	8	4.7	18.2
Yellowstone Park	6,200	11	47	23.87	30.13	+ .02	30.0	......	57	13	40	− 8	28	20	38	24	17	63	1.21	......	6	5,235	sw.	26	sw.	25	12	8	10	5.0	15.7
North Platte	2,821	43	52	27.07	30.06	+ .02	40.6	+ 5.4	76	14	55	2	30	26	48	32	27	70	0.67	+ 0.3	4	6,361	w.	37	se.	20	17	5	8	3.6	2.4
Middle Slope.							46.0	+ 4.7										66	1.60	+ 0.6										3.6	
Denver	5,291	129	136	24.70	30.03	− .03	41.8	+ 3.8	73	14	55	8	29	29	38	33	24	56	0.04	− 0.6	2	5,210	s.	35	w.	28	19	6	5	3.3	T.
Pueblo	4,685	80	86	25.27	30.01	− .04	43.4	+ 4.6	77	14	58	7	30	28	51	33	23	51	0.20	− 0.1	1	5,471	nw.	48	w.	23	19	7	4	3.1	
Concordia	1,398	42	47	28.56	30.06	− .02	44.8	+ 4.8	69	16	55	8	30	34	33	38	33	74	3.16	+ 2.3	4	5,126	s.	26	s.	23	18	7	5	3.1	
Dodge	2,509	44	54	27.42	30.06	− .01	45.4	+ 5.2	72	27	59	12	30	32	43	38	33	74	2.20	+ 1.7	4	7,027	se.	44	se.	23	13	11	6	4.7	
Wichita	1,358	78	86	28.63	30.08	.00	47.8	+ 5.0	73	17	59	13	30	36	34	41	36	72	2.59	+ 1.7	2	5,903	s.	30	w.	28	19	5	6	3.6	
Oklahoma	1,214	79	86	28.76	30.06	− .02	52.6	+ 4.7	82	27	64	18	30	42	33	44	38	66	1.42	− 1.1	5	7,091	n.	40	s.	23	15	9	6	4.1	
Southern Slope.							51.6	+ 3.3										74	3.30	+ 2.2										5.1	
Abilene	1,738	45	54	28.25	30.08	+ .01	56.1	+ 4.1	88	27	66	24	30	46	34	49	45	74	1.50	+ 0.1	7	5,064	sw.	32	sw.	27	6	14	10	6.1	
Amarillo	3,676	10	49	26.28	30.04	− .01	47.0	+ 2.5	75	27	58	18	29	36	35	40	36	76	5.09	+ 4.4	7	8,821	sw.	50	sw.	23	16	3	11	4.4	
Roswell	3,578	9	57	26.36	30.02	− .01	48.4	......	76	2	61	21	30	36	42	42	37	72	2.40	......	8	4,855	s.	35	w.	27	11	10	9	4.9	
Southern Plateau.							48.9	0.0										71	3.23	+ 2.6										4.4	
El Paso	3,762	10	110	26.22	30.01	+ .01	53.4	+ 1.9	75	22	63	33	29	44	36	46	41	71	2.40	+ 1.9	13	7,235	nw.	47	w.	28	9	11	10	5.4	
Santa Fe	7,013	33	39	23.25	30.05	+ .02	39.2	+ 1.6	59	3	48	18	29	30	29	33	28	70	3.39	+ 2.6	9	5,942	ne.	51	se.	22	13	11	6	4.0	2.9
Flagstaff	6,907	12	44	23.30	29.96	− .06	34.3	− 1.5	60	15	46	− 8	29	23	43	31	29	85	7.10	+ 5.7	12	4,669	e.	37	sw.	20	9	6	15	5.9	26.7
Phoenix	1,108	50	56	28.79	29.95	− .03	58.5	0.0	82	1	69	33	30	48	32	50	44	65	3.61	+ 3.1	11	2,794	e.	24	sw.	27	13	6	11	4.4	
Yuma	141	16	46	29.80	29.96	− .02	61.0	− 1.3	83	2	71	36	30	51	31	53	47	66	2.44	+ 2.2	5	3,602	ne.	31	s.	27	21	4	5	2.5	
Independence	3,910	11	42	......	29.99	− .06	46.8	− 1.0	73	2	58	27	30	36	31	....	....	....	0.43	+ 0.2	2	5,333	nw.	38	n.	4	18	6	6	....	T.
Middle Plateau.							39.4	+ 0.4										64	0.92	+ 0.2										4.2	
Carson City†	4,720	82	92	......	......	......	......	......	....	....	....	....	....	....	....	....	....	....	......	......	....	......	......	....	......	....	....	....	....	....	....
Winnemucca	4,344	18	56	25.63	30.09	− .05	36.8	− 0.3	66	3	53	11	28	21	51	29	20	58	1.32	+ 0.8	7	4,907	ne.	32	ne.	21	15	2	13	4.9	10.6
Modena	5,479	10	43	24.59	30.01	− .07	37.2	− 2.2	64	3	50	7	29	25	38	31	25	69	0.90	+ 0.7	6	5,900	w.	48	w.	27	13	9	8	4.7	6.6
Salt Lake City	4,366	105	110	25.63	30.05	− .07	41.8	+ 2.0	61	3	51	18	29	33	26	35	27	57	0.73	− 0.6	4	3,862	se.	36	s.	27	19	3	8	3.1	3.9
Durango	6,546	18	56	23.64	30.04	− .02	37.9	......	62	2	50	0	29	26	33	31	26	73	3.26	......	10	3,870	nw.	32	s.	22	14	5	11	4.7	12.2
Grand Junction	4,608	43	51	25.40	30.01	− .07	42.0	+ 1.9	67	21	54	18	29	30	35	34	27	61	0.75	+ 0.1	6	2,932	nw.	32	sw.	27	19	4	7	3.5	0.1
Northern Plateau.							38.6	− 0.3										69	1.00	− 0.4										5.1	
Baker City	3,471	82	58	......	......	......	......	......	....	....	....	....	....	....	....	....	....	....	......	......	....	......	......	....	......	....	....	....	....	....	....
Boise	2,739	61	68	27.22	30.13	− .04	40.3	+ 1.8	60	15	51	19	28	29	31	33	24	55	0.87	− 0.4	5	3,294	se.	30	e.	27	13	8	9	4.7	3.6
Lewiston	757	10	51	29.28	30.11	− .01	38.6	− 3.9	60	10	48	22	28	29	33	....	....	....	1.40	− 0.4	4	2,219	e.	34	w.	20	11	6	13	6.0	0.8
Pocatello	4,483	46	54	25.50	30.10	− .04	37.2	+ 4.2	64	3	48	13	22	26	41	30	22	61	0.73	− 0.6	4	5,479	e.	36	sw.	28	14	13	3	3.5	7.2
Spokane	1,929	101	110	28.03	30.13	+ .03	35.7	− 2.1	55	3	44	7	28	27	27	33	30	81	0.84	− 0.8	9	3,249	ne.	29	sw.	17	5	9	16	7.0	7.7
Walla Walla	1,000	71	79	29.03	30.12	− .01	41.4	− 1.6	61	19	50	18	28	32	29	38	34	78	1.63	+ 0.1	7	3,405	s.	36	s.	19	17	6	7	4.3	7.0
N. Pac. Coast Reg.							44.6	− 0.7										86	3.23	− 3.7										6.8	
North Head	211	11	56	......	30.06	+ .01	48.1	− 0.1	69	7	53	34	27	44	19	....	....	....	3.27	− 5.3	15	10,103	se.	72	se.	18	4	11	15	....	
Port Crescent	259	12	29	29.75	30.03	+ .03	42.1	− 0.2	60	11	49	23	28	36	23	....	....	....	2.43	− 4.0	15	3,797	se.	32	ne.	26	5	6	19	7.3	1.0
Seattle	123	185	224	29.95	30.08	+ .04	45.2	− 0.1	66	11	51	32	27	39	22	43	41	85	2.68	− 3.0	7	4,656	se.	40	s.	17	0	13	17	7.9	0.6
Tacoma	218	113	120	29.84	30.07	+ .03	43.8	− 0.4	64	11	50	29	27	37	22	....	....	....	3.08	− 3.0	10	3,275	sw.	28	sw.	25	2	11	17	7.2	T.
Tatoosh Island	86	7	57	29.92	30.02	+ .05	46.6	+ 0.2	60	11	50	31	28	43	13	44	42	86	5.54	− 6.6	17	12,099	e.	60	s.	18	4	4	22	8.0	2.0
Portland, Oreg	153	68	96	29.91	30.07	− .03	44.4	− 1.2	66	8	52	30	24	37	28	41	38	83	3.01	− 2.8	11	3,324	se.	21	sw.	19	5	10	15	6.7	T.
Roseburg	498	9	57	29.53	30.09	− .03	42.2	− 3.0	61	2	50	27	23	34	28	40	38	89	2.61	− 1.1	8	1,835	s.	22	w.	19	16	5	9	4.0	
Mid. Pac. Coast Reg.							53.0	− 0.5										63	1.99	− 1.4										4.0	
Eureka	62	62	80	29.99	30.06	− .05	49.0	− 1.1	70	10	56	37	28	42	26	46	44	84	3.93	− 1.5	8	4,343	se.	40	n.	4	10	8	12	5.2	
Mount Tamalpais	2,375	11	18	27.55	30.02	− .07	51.8	......	72	15	57	32	28	47	17	42	31	54	1.62	......	6	14,702	nw.	64	ne.	5	15	6	9	3.9	T.
Red Bluff	332	50	56	29.67	30.03	− .08	53.4	− 0.5	82	7	65	31	28	42	40	44	34	54	1.92	− 1.2	7	4,481	n.	36	n.	4	17	10	3	3.5	
Sacramento	69	106	117	29.94	30.01	− .08	53.2	− 0.3	77	6	64	33	28	42	31	45	35	55	1.20	− 1.0	3	6,587	se.	40	n.	4	19	7	4	3.0	
San Francisco	155	161	167	29.88	30.05	− .04	56.2	− 0.1	74	6	62	44	27	50	22	49	43	66	0.92	− 1.8	6	5,816	w.	32	se.	29	13	11	6	4.3	
S. Pac. Coast Reg.							56.7	− 0.8										67	2.32	+ 1.0										3.6	
Fresno	330	67	70	29.66	30.02	− .04	52.6	− 2.8	77	2	64	32	22	41	32	45	36	61	0.96	− 0.2	5	2,798	nw.	26	nw.	20	22	5	3	2.7	
Los Angeles	338	116	123	29.61	29.98	− .04	59.2	0.0	84	14	69	39	21	50	28	51	45	67	2.98	+ 1.6	8	3,735	ne.	34	sw.	27	13	10	7	4.2	
San Diego	87	94	102	29.87	29.96	− .06	59.2	+ 0.6	80	11	66	44	21	53	23	53	49	73	3.38	+ 2.6	9	4,699	ne.	33	w.	27	18	5	7	4.1	
San Luis Obispo	201	47	54	29.79	30.01	− .05	55.9	− 1.1	83	12	69	33	29	43	39	49	42	67	1.97	0.0	8	3,539	n.	25	se.	23	17	8	5	3.3	
West Indies.																															
Grand Turk	11	6	20	29.94	29.95	.00	79.6	......	90	3	86	65	27	73	....	....	....	....	7.88	......	13	......	e.	....	......	....	....	....	....	....	
San Juan	82	48	90	29.84	29.92	+ .02	79.4	+ 0.8	89	3	85	70	28	74	15	74	73	84	5.33	− 1.2	14	5,726	se.	30	e.	4	16	11	3	3.9	

* More than one date. † Station closed and moved to Reno, Nev., Nov. 8, 1905.

TABLE II.—*Climatological record of cooperative observers, November, 1905.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alabama.	°	°	°	*Ins.*	*Ins.*
Alaga				0.66	
Anniston	76	25	53.4	2.01	
Ashville	75	25	53.9	1.65	
Benton				1.94	
Bermuda	80	33	58.6	3.25	
Boligee	80	29	56.6	1.24	
Bridgeport				1.75	
Burkeville				1.50	
Calera				1.30	
Camp Hill	78	29	54.6	1.60	
Citronelle	81	36	62.1	3.31	
Clanton	79	27	55.8	1.18	
Cordova	80	24	54.6	1.68	
Dadeville				2.01	
Daphne	82	40	62.6	3.90	
Decatur	79	24	55.4	1.30	
Delmar	75	20	53.8	1.75	
Demopolis				1.90	
Eufaula	76	31	55.3	1.82	
Evergreen	80	32	55.5	0.70	
Flomaton	88	33	61.0	3.10	
Florence	76	21	52.6	0.88	
Fort Deposit	78	33	56.9	1.19	
Gadsden	78	24	53.4	2.41	
Goodwater	77	27	54.7	1.86	
Greensboro	78	30	58.4	1.43	
Greenville				2.70	
Guntersville				1.90	
Hamilton	76[d]	23[d]	54.2[d]	2.64	
Highland	81	34	59.3	2.27	
Livingston	78	30	56.1	1.09	
Lock No. 4	78	26	54.8	1.95	
Lucy	82	31	59.8	1.17	
Madison Station	76	22	54.0	1.50	
Maplegrove	78	26	51.8	2.19	
Marion	78	28	55.6	0.87	
Milstead				2.76	
Newbern	81	28	57.6	0.93	
Notasulga				1.23	
Oneonta	75	21	53.0	2.07	
Opelika	80	30	57.2	1.82	
Ozark	79	39	57.9	1.66	
Prattville	88	30	57.0	1.87	
Pushmataha	84	30	59.4	0.96	
Riverton	78	20	51.8	1.20	
Scottsboro	75	25	52.0	0.76	
Selma	88	33	58.6	1.71	
Springhill	72	45	61.1	4.64	
Talladega	80	25	52.4	2.47	
Tallassee				2.11	
Thomasville	78	32	57.0	0.55	
Tuscaloosa				1.38	
Tuscumbia	73	23	52.0	0.93	
Tuskegee	85	33	59.5	2.43	
Union Springs	77	34	57.6	2.15	
Uniontown	81	30	57.4	1.05	
Valleyhead	75	20	51.2	0.80	
Vienna				1.04	
Wetumpka	82	31	58.7	2.20	
Alaska.					
Chestochena	45	−11	23.0	0.63	0.5
Copper Center	48	−10	25.2	0.94	2.8
Fort Liscum		21		10.37	24.9
Juneau	59	7	41.6	15.49	
Ketchemstock	28	−35	1.8	0.36	3.0
Killisnoo	60	17	39.2	8.40	T.
Loring	54	10	39.6	28.49	1.0
Orca	50	26	37.7	29.64	
Sitka	60	19	42.0	11.37	T.
Skagway	56	15	37.4	3.25	
Sunrise	50	7	32.8	9.47	4.9
Teikhill	45	−6	23.2	4.90	17.0
Arizona.					
Allaire Ranch				3.12	
Alpine				6.30	17.0
Aztec	92	30	62.6	5.30	
Benson	80	28	53.2	3.08	
Blue	67	20	43.4	6.03	1.0
Buckeye	85	29	57.6	5.01	
Casagrande	87	32	59.9	6.32	
Cochise *[1]	78	32	51.8	2.65	
Congress	73	34	54.2	9.44	
Douglas	81	28	53.8	2.73	
Dudleyville	82	30	56.2	5.65	
Duncan	78	23	49.4	2.90	
Flagstaff				7.60	51.0
Fort Apache	72	15	44.2	4.64	7.5
Fort Defiance	60	−6	35.5	3.58	3.8
Fort Huachuca	75	16	46.0	6.23	
Gilabend	90	33	61.4	3.84	
Globe	77	28	52.2	5.64	
Grand Canyon	67	−1	38.8	6.96	37.0
Greer				5.28	10.2
Holbrook	67	24	44.2	3.82	6.0
Huachuca Res				14.25	
Jerome	66	26	48.0	8.80	1.2
Kingman	74	26	51.0	1.86	T.
Maricopa	87	32	58.4	3.47	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Arizona—Cont'd.	°	°	°	*Ins.*	*Ins.*
Mesa	83	29	58.2	3.55	
Mohawk Summit *[1]	92	40	64.4	2.25	
Natural Bridge				10.45	2.0
Nutrioso				5.25	14.0
Oracle	70	30	51.6	7.80	3.0
Parker	91	30	60.3	1.91	
Phoenix	84	29	57.8	3.78	
Picacho *[1]	82	41	59.2	4.18	
Pinal Ranch				9.75	4.5
Pinto				3.85	11.1
Prescott	70	12	44.1	8.68	7.5
Roosevelt	86	31	57.5	5.21	
San Carlos	80	31	55.2	4.04	
San Simon	76	28	50.5	2.51	T.
Seligman	70	18	43.6	4.83	0.5
Sentinel *[1]	83	38	58.4		
Showlow				5.68	17.5
Signal				3.04	
Tempe	85	31	56.6	3.80	
Thatcher	75	29	53.9	4.56	
Tombstone	72	27	50.6	3.46	
Tonto	80	31	54.6	7.85	
Tuba	63	10	38.6	2.32	12.0
Tucson	82	31	57.6	1.61	
Upper San Pedro	74	27	51.6	1.75	T.
Vail *[5]	87	40	61.0	5.23	
Walnut Grove				7.75	7.0
Willcox	76	27	51.0	3.63	
Williams	78	−4	42.0	7.69	25.0
Yarnell				9.35	3.5
Young	85	19	50.6	8.36	
Arkansas.					
Alicia	78	20	51.1	2.90	
Amity	84	23	54.7	5.70	
Arkadelphia	80	30	56.8	4.64	
Arkansas City				3.74	
Arnett	75	12	52.0	3.91	T.
Batesville	79	18	53.1	3.98	
Beebranch	79	15	52.8	4.00	
Blackrock				3.71	
Blanchard Springs	82	25	56.0	4.56	
Brinkley	78	22	54.5	4.28	
Calico Rock				1.30	
Camden	83	26	58.0	3.46	
Clarendon				3.72	
Conway	80	19	53.2	2.74	
Corning	76	18	49.0	2.80	
Dallas	77	21	54.8	3.62	
Dardanelle				2.72	
Des Arc	80	22	55.1	5.73	
Dodd City	77	12	49.5	0.17	
Dutton	78	13	49.8	4.59	
Eldorado	80	26	56.0	3.79	
Elon				2.22	
Eureka Springs	78	19	51.7	1.56	
Fayetteville	77	14	50.0	1.55	
Forrest City	79	23	53.2	3.55	
Fulton				2.38	
Hardy	75	15	51.2	1.37	
Helena	78	24	53.4	1.84	
Hope	83	25	56.8	3.49	
Howe	84	25	55.8	4.96	
Huntsville	75			2.20	
Jonesboro		21		1.81	
Lacrosse	80	22	51.0	0.88	
Lake Village	78	27	56.2	3.77	
Lonoke	78	21	53.6	6.17	
Lutherville	76	17	50.2	3.41	
Luxora				3.10	
Malvern	81	24	53.5	5.35	
Marked Tree				6.23	
Marvell	79	23	55.2	2.48	
Mountain Home	78[j]	14[j]	49.6[j]	1.38	
New Lewisville	81	26	56.0	3.42	
Newport	79	19	53.2	1.20	
Oregon	80	9	50.0	1.79	
Osceola	79	20	52.6	3.13	
Ozark	78	18	52.3	2.90	
Perry	74	22	51.8	3.55	
Pinebluff	76	24	53.4	4.47	
Pocahontas	88	18	52.6	2.14	
Pond	78	11	50.0	1.13	
Prescott	81	25	55.8	3.6[g]	
Princeton	80	23	55.1	4.22	
Rison	80	23	57.2	3.23	
Russellville	74[e]	21[b]	50.4[e]	3.13	
Silversprings	76	14	50.0	2.59	
Spielerville	79	20	54.0	2.23	
Stuttgart	78	22	54.3	3.89	
Tate	81	22	52.0	3.10	
Texarkana	71	25	51.4	4.82	
Warren	81	22	54.8	3.54	
White Cliffs				4.84	
Wiggs	81	20	53.4	5.03	
Winchester	81	25	56.2	1.36	
Witts Springs	80	12	48.9	3.55	
California.					
Alturas				0.94	12.5

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Angiola	85	26	51.6	1.01	
Azusa	86	34	57.0	2.20	
Bagdad	81	34	58.2	1.50	
Bakersfield	88	25	51.4	2.50	
Barber				0.94	
Barstow	82	24	51.7	0.90	
Bear Valley				5.60	47.5
Berkeley	75	33	52.9	1.46	
Bishop	80	18	44.8	0.50	1.2
Blue Canyon	69	20	41.6	4.85	41.0
Bodie	62	−9	26.6	2.67	22.2
Bowman				4.76	32.5
Branscomb	78	25	50.7	5.92	4.5
Brush Creek	72	28	45.2	4.65	3.0
Butte Valley				3.16	23.0
Calexico	80	37	59.8	1.96	
Campbell	77	32	52.4	1.87	
Campo				5.86	T.
Cedarville	63	14	36.5	1.02	16.0
Chico	78	33	51.8	1.16	
Claremont	84	34	57.0	2.48	
Cloverdale	83	27	54.6	2.32	
Colusa	77	32	52.6	1.80	
Craftonville				3.40	
Crescent City	74	31	48.0	6.91	
Crockers				3.80	27.0
Cuyamaca	59	23	38.6	10.15	7.0
Delta	83	28	50.2	2.08	4.0
Diamond				1.56	
Dobbins	88	30	56.6	2.40	
Drytown	74	32	51.1	2.32	
Durham	82	28	52.6	0.87	
Elcajon	84	32	58.3	4.89	
Electra	78	35	54.6	2.39	
Elmwood	79	27	51.4	0.36	
Elsinore	82	30	56.6	5.61	
Emigrant Gap	67	22	42.4	5.50	47.0
Escondido	87	45	66.4	4.45	
Folsom	82	34	55.0	1.74	
Fordyce				4.20	63.0
Fort Ross	67	34	50.8	4.71	
Fruitvale				1.35	
Georgetown	73	29	50.6	3.78	6.8
Gilroy (near)	87	24	51.5	1.69	
Glendora				2.89	
Grass Valley				3.21	12.0
Greenville	75	15	40.0	2.58	17.0
Hanford	81	25	53.0	1.16	
Healdsburg	89	27	53.8	4.01	
Hollister	81	29	52.0	1.62	
Indio	87	30	61.0	1.06	
Idylwild	69	14	42.3	3.38	12.0
Imperial	87	34	61.1	0.83	
Iowa Hill	76	30	51.8	3.36	7.0
Irvine				6.21	
Isabella				2.08	
Jolon				1.82	
Kennedy Gold Mine				1.80	
Kentfield				8.33	
Kernville				1.60	
King City	88	20	55.2	1.54	
Laporte	73	21	42.4	4.81	43.1
Le Grand	78	30	51.4	1.35	
Lemoncove	89	32	56.6	1.95	
Lick Observatory	66	23	46.2	3.00	10.5
Livermore	82	32	54.6	1.61	
Lodi	78	30	51.0	0.61	
Lone Pine	76	21	45.5	0.63	0.8
Los Gatos	78	37	54.6	3.00	
Lowe Observatory				3.74	
Magalia	82	26	52.9	2.33	5.0
Mammoth	85	28	57.2	T.	
Marysville	79	30	51.8	0.91	
Merced	81	22	51.9	1.83	
Mercury				4.60	
Mills College				1.63	
Milo				2.05	0.1
Milton (near)	75	37	55.0	1.71	
Mohave	85	30	56.4	1.25	T.
Mokelumne Hill	74	33	53.4	2.30	
Montague	69	15	39.0	0.49	T.
Monterio	78	26	49.6	3.85	
Monumental	71	28	43.8	8.51	21.8
Mount St. Helena				3.85	
Napa	82	30	52.4	1.00	
Needles	80	35	59.2	2.20	
Nellie				9.99	7.2
Nevada City	79	27	48.8	2.93	3.0
Newcastle	81	38	56.4	1.69	
Newman	77	31	53.4	0.76	
Niles	76	36	54.0	2.36	
Nordhoff	70	24	46.0	2.04	T.
North Bloomfield	76	28	46.7	3.83	9.0
Oakland	75	39	54.6	1.48	
Orleans	81	26	49.6	4.77	
Oroville (near)	84	32	52.8	1.76	
Ozena				0.97	
Palermo	83	29	51.9	1.35	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Peachland	84	28	52.8	2.80	
Pilot Creek	.....	.....	.....	4.37	31.0
Pine Crest	83	37	58.8	1.78	
Placerville	74	28	47.0	3.00	3.0
Point Lobos	72	46	59.5	1.12	
Point Reyes Light	72	40	55.1	2.21	
Porterville	79	29	53.6	1.13	
Poway	83	32	58.0	4.43	
Priest Valley	.....	.....	.....	1.77	2.5
Quincy	61	18	38.0	2.84	17.0
Redding	80	29	52.3	2.84	4.2
Redlands	82	32	56.2	2.38	
Reedley	79	27	52.2	1.20	
Represa	.....	.....	.....	1.89	
Riovista	78	34	53.5	0.81	
Riverside	82	30	55.2	2.73	
Rocklin	80	31	52.6	1.36	
Rohnerville	.....	.....	.....	4.20	
Sacramento	78	31	51.4	1.39	
Salinas	92[c]	31[c]	54.2[c]	2.60	
Salton	80	35	61.6	0.30	
San Bernardino	85	29	55.2	2.81	
San Jacinto	84	29	54.3	2.54	
San Jose	78	37	53.8	2.17	
San Leandro	80	28	52.2	1.75	
San Miguel Island	.....	.....	.....	2.50	
Santa Barbara	84	41	59.8	1.14	
Santa Clara College	80	32	53.5	2.02	
Santa Cruz	82	31	53.3	2.50	
Santa Maria	85	30	56.2	1.37	
Santa Rosa	85	28	53.0	1.97	
Sausalito	.....	.....	.....	3.55	
Shasta	87	31	56.4	3.05	5.0
Sierra Madre	78	38	57.2	3.15	
Sisson	68	16	40.8	2.07	14.0
Sonoma	.....	.....	.....	1.74	
Sonora	64	36	49.6	2.85	4.5
Southeast Farallon	70	44	54.8	1.89	
Sterling	.....	.....	.....	2.65	15.2
Stockton	76	34	49.7	0.86	
Storey	77	26	49.8	0.97	
Summerdale	69	18	44.3	4.30	33.0
Summit	70	18	43.2	7.80	78.0
Susanville	65	13	37.6	1.21	7.0
Tejon	72	32	53.2	1.90	
Towle	72	24	45.5	2.90	16.0
Truckee	60	4	36.4	3.40	34.0
Tulare	84	24	52.5	0.94	
Tustin	.....	.....	.....	5.85	
Ukiah	79	26	50.2	2.24	
Upland	74	32	52.4	2.96	
Upperlake	81	26	51.4	1.55	
Upper Mattole	.....	.....	.....	5.55	
Vacaville	83	31	54.3	1.60	
Visalia	89	25	51.9	1.32	
Volcano	84	36	59.8	1.00	
Wasco	76	26	52.0	0.90	
Westpoint	.....	.....	.....	2.77	6.0
West Saticoy	.....	.....	.....	1.33	
Wheatland	80	32	51.4	1.11	
Willits	85	20	48.9	1.28	T.
Woodside	72	36	53.0	3.97	
Yreka	.....	.....	.....	0.89	2.0
Zenia	75	25	48.4	6.03	6.0
Colorado.					
Akron	.....	.....	.....	0.12	2.0
Alford	68	4	37.3	0.14	T.
Antelope Springs	49	−27	24.4	2.95	41.5
Ashcroft	54	−16	28.4	1.09	16.0
Boulder	75	6	43.9	0.23	T.
Breckenridge	53	−11	28.0	0.11	2.0
Buenavista	65	5	35.4	1.54	5.8
Burlington	75	9	41.8	0.66	
Canon City	75	10	46.1	0.14	
Cardinal	47	4	28.5	0.57	9.0
Castlerock	70	2	39.2	.....	
Cheesman	69	8	39.6	0.06	0.5
Cheyenne Wells	73	10	43.6	1.13	
Clearview	59	2	32.4	0.73	11.8
Collbran	65	3	37.5	1.18	4.0
Colorado Springs	66	6	40.8	0.23	T.
Cripplecreek	.....	.....	.....	0.17	3.0
Delta	67	0	40.4	0.61	
Eagle	60	−3	32.7	0.58	4.0
Fort Collins	74	3	37.8	0.07	
Fort Morgan	74	5	39.3	T.	
Fowler	.....	.....	.....	0.21	
Frances	52	4	32.8	0.59	6.8
Fruita	63	15	39.4	1.17	T.
Garnett	60	−5	31.2	0.87	4.0
Gleneyre	72	0	39.8	0.25	
Glenwood Springs	65	5	36.2	0.90	0.3
Grand Valley	71	7	40.2	2.67	5.0
Greeley	76	3	39.0	0.03	
Gunnison	58	.....	.....	0.30	2.1
Hahns Peak	62	−8	29.3	1.72	22.0
Hamps	75	−2	38.5	0.13	
Hoehne	77	4	40.4	0.58	T.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Colorado—Cont'd.	°	°	°	*Ins.*	*Ins.*
Holly	82	10	46.4	1.00	
Holyoke	78	4	41.8	0.32	T.
Idaho Springs	60	12	38.3	0.30	2.7
Lake City	61	−11	31.4	2.06	29.5
Lake Moraine	54	−6	29.4	0.71	11.0
Lamar	82	13	47.6	0.65	
Laporte	.....	.....	.....	0.20	
Las Animas	78	8	43.8	0.60	
Lay	60	−5	31.1	1.26	6.5
Leroy	73	5	39.4	0.12	2.0
Longs Peak	55	−4	29.4	0.12	2.0
Mancos	61	6	37.6	2.93	11.0
Meeker	61	−3	34.9	0.78	4.5
Montrose	65	3	37.2	0.89	4.0
Moraine	60	6	33.2	0.05	1.0
Pagoda	66	−6	35.6	0.72	4.0
Paonia	66	9	42.1	1.29	1.0
Platte Canon	.....	.....	.....	0.15	
Rockyford	78	7	43.6	0.41	
Saguache	60	−2	34.3	0.18	3.0
Salida	65	9	37.4	0.90	3.0
San Louis	65	−1	35.7	0.10	1.5
Santa Clara	62	10	38.0	1.35	9.0
Sapinero	56	−8	30.4	1.23	10.2
Sheridan Lake	74	12	43.8	1.24	
Silt	67	3	39.4	1.46	9.0
Silverton	61	−23	28.6	5.81	36.0
Sugar City	.....	.....	.....	0.58	
Trinidad	71	15	43.8	1.08	
Victor	65	−2	33.8	0.26	2.8
Vilas	.....	.....	.....	1.74	
Wagon Wheel	65	−27	27.6	2.16	26.0
Waterdale	75	3	40.3	0.06	
Westcliffe	65	0	35.0	0.82	4.0
Whitepine	48	−18	26.4	0.76	7.2
Wray	81	9	42.2	0.60	2.2
Yuma	.....	.....	.....	0.05	1.0
Connecticut.					
Bridgeport	65	17	41.5	2.62	
Canton	60	7	35.8	2.33	T.
Colchester	64	10	39.2	2.71	T.
Falls Village	.....	.....	.....	2.54	0.8
Hawleyville	60	11	39.2	2.17	1.0
Lake Konomoc	.....	.....	.....	3.05	
New London	61	17	41.6	2.20	
North Grosvenor Dale	63	8	36.1	2.55	
Norwalk	62	12	38.8	2.38	T.
Southington	62	10	39.1	2.05	0.5
South Manchester	.....	.....	.....	1.66	
Storrs	62	10	38.1	2.73	
Voluntown	65	7	40.0	1.79	
Wallingford	.....	.....	.....	2.20	
Waterbury	62	11	39.6	1.72	T.
West Cornwall	58	8	36.2	2.19	1.0
West Simsbury	.....	.....	.....	1.91	0.5
Delaware.					
Delaware City	.....	.....	.....	1.41	
Milford	70	17	46.5	0.70	T.
Millsboro	73	14	45.4	0.58	
Newark	67	15	42.8	2.11	
Seaford	72	16	44.6	0.66	T.
District of Columbia.					
Distributing Reservoir*[b]	69	27	45.0	0.79	
Receiving Reservoir*[b]	68	24	43.8	0.99	
West Washington	75	19	44.5	1.30	T.
Florida.					
Apalachicola	79	44	63.7	0.76	
Archer	89	41	65.2	0.87	
Avon Park	87	46	69.0	0.19	
Bartow	83	45	66.8	0.57	
Bonifay	80	35	61.0	1.00	
Brooksville	87	52	70.0	0.33	
Carrabelle	79	40	62.3	1.20	
Clermont	87	48	69.4	0.03	
De Funiak	84	34	60.2	2.33	
Deland	85	45	66.7	.....	
Eustis	84	44	65.8	0.38	
Federal Point	86	44	65.6	0.91	
Fernandino	83	46	64.6	1.07	
Flamingo	91	59	75.8	T.	
Fort Meade	88	45	68.6	0.00	
Fort Myers	83	52	69.9	0.06	
Fort Pierce	85	48	70.1	1.46	
Gainesville	86	45	66.0	0.46	
Grasmere	81	46	65.8	.....	
Huntington	81	45	64.4	1.24	
Hypoluxo	85	52	72.7	2.47	
Inverness	85	42	65.0	0.57	
Jasper	83	37	61.4	1.91	
Johnstown	84	.....	.....	0.61	
Kissimmee	80	46	66.0	T.	
Lake City	85	42	62.8	1.20	
Macclenny	84	39	63.3	0.85	
Madison	82	39	63.4	1.59	
Malabar	85	49	69.4	0.39	
Manatee	86	47	68.4	0.35	
Marianna	82	34	60.1	1.20	
Merritt Island	82	59	70.8	1.54	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Florida—Cont'd.	°	°	°	*Ins.*	*Ins.*
Miami	87	57	74.2	3.65	
Middleburg	87	35	61.8	0.07	
Molino	84	31	60.2	2.66	
Monticello	84	39	62.8	1.12	
Mount Pleasant	90	33	61.8	1.40	
New Smyrna	85	45	67.6	2.23	
Nocatee	86	47	69.0	0.69	
Ocala	86	44	66.4	0.60	
Orange City	89	40	66.6	0.37	
Orange Home	86	44	66.6	0.53	
Orlando	81	44	66.0	0.33	
Plant City	85	43	67.5	0.00	
Rockwell	86[c]	41[c]	63.2[c]	0.60	
St. Andrews	79	35	60.2	1.77	
St. Augustine	84	45	65.9	0.45	
St. Leo	86	46	66.8	0.28	
Sand Key	85	71	76.7	0.46	
Stephensville	84[f]	39[f]	64.0[f]	1.55	
Sumner	84	40	63.4	1.12	
Switzerland	82	43	63.9	0.50	
Tallahassee	79	39	60.8	1.17	
Tarpon Springs	86	45	66.4	0.21	
Wausau	82	34	61.4	1.41	
Georgia.					
Abbeville	.....	.....	.....	1.93	
Adairsville	72[c]	26[c]	51.2[c]	1.81	
Albany	75	39	59.6	1.76	
Allapaha	85	33	58.8	1.14	
Americus	78	35	57.0	2.09	
Athens	69	28	50.8	2.09	
Bainbridge	85	32	60.0	1.36	
Blakely	80	35	60.3	0.85	
Bowersville	75	28	52.1	2.35	
Butler	.....	.....	.....	2.28	
Camak	80	26	52.4	0.70	
Canton	.....	.....	.....	1.88	
Carlton	.....	.....	.....	1.84	
Carrollton	76	25	51.6	0.66	
Clayton	75	20	49.8	0.96	
Columbus	86	32	58.0	2.07	
Cordele	80	30	56.9	1.63	
Covington	.....	.....	.....	2.31	
Cuthbert	77	34	58.6	1.76	
Dahlonega	76	24	48.8	1.92	
Dawson	81	32	59.0	1.56	
Diamond	70	18	50.7	1.85	
Dublin	.....	.....	.....	1.75	
Dudley	80	32	57.6	1.70	
Eastman	79	33	57.2	1.55	
Eatonton	78	28	55.6	1.56	
Elberton	74	29	53.2	2.40	
Experiment	75	29	55.0	1.82	
Fitzgerald	80[d]	35[c]	59.6[d]	1.66	
Fleming	90	32	59.4	1.53	
Forsyth	79	28	56.4	1.46	
Fort Gaines	83	34	57.4	2.36	
Gainesville	69	30	49.4	1.75	
Gillsville	74	27	53.0	1.59	
Glenville	80	35	57.4	1.53	
Greenbush	71	24	51.2	1.15	
Greensboro	78	26	53.0	2.60	
Griffin	75	30	55.1	1.35	
Harrison	80	30	56.3	1.69	
Hawkinsville	87	31	57.1	1.90	
Lost Mountain	75	25	52.2	2.00	
Louisville	82	32	58.2	1.45	
Lumpkin	80	34	58.4	1.80	
Marshallville	78	31	58.0	2.38	
Mauzy	80[j]	39[k]	59.4[k]	1.11	
Milledgeville	79	27	53.9	1.58	
Millen	84[c]	29[c]	58.2[c]	1.80	
Montezuma	.....	.....	.....	2.63	
Monticello	76	29	55.0	1.86	
Morgan	78	34	58.0	1.56	
Newnan	79	25	53.1	1.96	
Oakdale	.....	.....	.....	1.59	
Oxford	75[c]	25[d]	52.0[c]	2.36	
Point Peter	75	25	52.9	2.16	
Poulan	83	31	58.7	1.02	
Putnam	88	33	57.9	1.51	
Quitman	81	36	59.8	1.23	
Ramsey	75	25	52.6	1.38	
Resaca	.....	.....	.....	1.48	
Rome	74	25	51.4	2.14	
St. Marys	84	42	62.0	0.79	
Screven	82	34	61.2	1.23	
Statesboro	82	32	59.8	1.82	
Talbotton	78	29	56.8	1.97	
Tallapoosa	77	23	52.3	2.28	
Thomasville	83	35	60.1	1.58	
Toccoa	75	27	50.4	1.79	
Valdosta	83	38	61.1	0.25	
Valona	83	39	60.5	1.60	
Vidalia	84	32	58.8	1.62	
Washington	72	28	51.8	2.24	
Waverly	85	38	61.7	2.10	
Waycross	83	37	60.0	1.09	
Waynesboro	79	28	56.2	1.62	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Georgia—Cont'd.	°	°	°	*Ins.*	*Ins.*
Westpoint	78	27	55.0	1.58	
Woodbury	75	22	52.8	1.58	
Idaho.					
American Falls	64	6	34.6	0.95	
Blackfoot	62	5	35.0	1.03	10.3
Caldwell	60	14	36.8	0.74	7.0
Cambridge	65	10	36.6	1.68	......
Chesterfield	62	1	32.6	0.83	10.0
Dent	54	21	38.2	3.00	5.5
Ellerslie	64	12	40.4	0.72	5.0
Fernwood	......	......	.	2.16	20.0
Forney	55	−8	29.4	0.51	5.2
Garnet	67	20	41.7	0.31	2.0
Glens Ferry	84[1]	10[1]	38.4[1]	0.40	4.0
Grangeville	61	9	37.2	3.50	13.1
Hailey	63	−2	37.6	0.64	6.4
Hope	......	......	......	2.90	8.0
Idaho Falls	60	5	34.2	1.16	12.0
Kellogg	59	15	35.6	3.04	12.7
Lake	56	−12	31.9	2.40	24.0
Lakeview	54	11	35.2	3.50	19.0
Landore	59	11	33.8	2.95	33.9
Lardo	......	......	......	2.55	......
Lost River	60	−10	35.9	0.55	6.5
Meadows	59	10	33.0	1.45	......
Milner	63	10	35.0	0.88	8.5
Minidoka	64	11	36.8	1.01	11.4
Moscow	58	10	38.5	1.88	8.9
Murray	55	3	29.8	2.35	11.0
Nevins Ranch	......	......	......	0.70	6.0
Oakley	69	14	37.8	......	......
Ola	60	10	37.0	1.55	15.8
Orofino	54	20	33.6	2.40	0.5
Paris	61	1	33.8	0.86	9.0
Payette	63	14	38.2	0.63	5.8
Pearl	......	......	......	0.79	11.0
Pollock	61	21	40.4	0.83	......
Poplar	......	......	......	0.67	......
Porthill	54	7	32.5	1.36	10.0
Priest River	52	20	34.7	2.23	16.5
Roosevelt	65	2	31.8	1.01	16.5
St. Maries	62	18	38.3	2.51	16.0
Salem	......	......	......	0.70	7.0
Soldier	69	0	31.6	0.50	7.5
Stanrod	......	......	......	3.76	32.4
Vernon	61	8	34.9	0.50	3.0
Weston	64	3	37.8	0.98	3.5
Illinois.					
Albion	72	16	45.2	2.62	
Aledo	64	6	39.8	2.05	0.5
Alexander	76	10	43.4	1.43	T.
Antioch	63	8	36.2	2.70	1.0
Ashton	62	8	37.9	1.69	T.
Astoria	70	10	40.1	2.10	T.
Aurora	69	9	38.2	2.21	0.1
Benton	78	24	49.6	2.77	
Bloomington	74	12	42.3	2.65	T.
Bushnell	70	9	42.0	2.25	
Cambridge	65	10	39.4	2.27	T.
Carlinville	78	11	44.4	1.68	T.
Carlyle	......	......	......	2.09	
Carrollton	79	10	44.8	2.20	T.
Charleston	74	13	43.2	1.85	T.
Chester	79	18	49.2	2.18	
Cisne	75	16	46.6	1.84	
Coatsburg	68[j]	21[j]	42.4[j]	1.93	
Cobden	75	17	48.8	2.24	
Colchester	71	9	42.5	2.12	
Decatur	76	12	40.9	1.70	T.
Dixon	63	8	36.6	1.83	T.
Equality	75	21	48.2	2.82	T.
Flora	68[d]	14[e]	43.6[d]	1.83	T.
Friendgrove	71	17	45.1	2.78	T.
Galva	66	7	38.2	1.87	0.3
Grafton	......	......	......	1.54	
Greenville	77	12	45.4	1.95	
Griggsville	73	11	44.4	1.95	T.
Halfway	74[e]	18[e]	47.8[e]	2.13	T.
Havana	72	11	42.7	2.54	
Henry	72[e]	10[b]	40.8[b]	2.21	T.
Hillsboro	78	13	45.4	1.65	T.
Hoopeston	71	14	40.6	2.83	T.
Joliet	68	14	39.1	2.66	0.1
Kishwaukee	62	9	37.8	2.24	T.
Knoxville	69	9	41.2	2.30	T.
Lagrange	70	19	39.0	2.77	
Laharpe	68	8	40.6	2.10	T.
Lanark	61	8	37.0	2.16	T.
Loami	......	......	......	1.54	T.
McLeansboro	74	19	46.0	2.66	
Martinsville	75	14	41.8	2.70	
Martinton	73	7	40.4	2.68	T.
Mascoutah	75	15	44.6	2.90	
Mattoon	75	15	46.2	1.57	T.
Minonk	70	10	39.8	1.68	T.
Monmouth	67	8	39.4	2.16	
Morrison	64	9	38.8	1.91	T.
Morrisonville	75	10	43.2	1.74	
Illinois—Cont'd.	°	°	°	*Ins.*	*Ins.*
Mount Carmel	......	......	......	3.00	T.
Mount Pulaski	75	11	42.2	1.34	T.
Mount Vernon	70	15	46.7	2.52	
New Burnside	70	18	48.0	2.74	T.
Olney	73	14	44.2	1.65	T.
Ottawa	70	13	40.6	2.01	T.
Palestine	72	16	44.4	1.80	T.
Pana	75	11	42.6	1.95	
Paris	74	15	43.4	2.39	
Peoria	72	12	41.7	2.20	
Philo	74	14	40.0	1.01	
Plumhill	76	15	45.4	2.02	
Pontiac	71	12	40.6	2.26	T.
Rantoul	73	12	41.0	2.62	T.
Raum	76	18	47.8	4.34	T.
Riley	61	8	37.1	1.57	0.3
Robinson	72	15	43.8	1.73	
Rockford	62	13	41.6	2.33	T.
Rushville	72	11	43.2	1.03	T.
St. Charles	67	9	37.2	2.42	T.
St. John	76	11	47.2	1.85	
Shobonier	77	14	44.5	2.69	
Streator	71	12	38.4	1.73	
Sullivan	77	13	42.6	2.44	T.
Sycamore	64	8	36.8	2.20	T.
Tilden	76	25	46.9	2.02	T.
Tiskilwa	64	9	38.5	2.03	T.
Tuscola	75	13	40.3	1.94	T.
Urbana	74	13	39.5	1.45	
Walnut	64	10	39.8	1.18	T.
Warsaw	......	......	......	1.63	
Winchester	75	13	43.6	1.47	
Windsor	76	12	42.5	1.52	T.
Winnebago	60	8	37.2	2.29	T.
Yorkville	66	9	37.6	2.46	T.
Zion	59	4	36.0	3.67	T.
Indiana.					
Anderson	68	17	40.9	1.80	T.
Angola	67	14	37.5	2.07	1.1
Auburn	68	13	37.0	3.62	
Bedford	68	18	43.4	1.80	T.
Bloomington	71	20	45.9	1.73	
Bluffton	72	14	38.2	2.83	T.
Butlerville	66	18	43.4	2.66	
Cambridge City	65	19	39.4	1.93	
Columbus	68	17	43.4	1.95	T.
Connersville	67	18	41.6	2.10	
Crawfordsville	73	15	41.1	2.27	
Delphi	74	17	38.3	3.41	T.
Elkhart	72	13	38.1	2.57	1.0
Farmersburg	75[e]	15[e]	44.2[e]	1.98	
Farmland	66	16	41.2	1.75	T.
Fort Wayne	71	16	40.0	3.82	T.
Franklin	68	17	42.3	1.82	T.
Greencastle	70	14	42.9	1.88	T.
Greenfield	66	18	42.2	2.00	
Greensburg	65	18	42.0	2.01	
Hammond	72	20	40.4	3.76	
Huntington	71	15	37.6	3.29	T.
Jeffersonville	68	23	45.6	5.31	T.
Knox	72	14	39.0	2.56	1.5
Kokomo	73	15[d]	40.0	2.56	T.
Lafayette	73	18	39.4	4.10	T.
Laporte	72	15	37.4	2.61	0.5
Lima	71	13	36.8	1.85	T.
Logansport	71	12	38.3	3.69	T.
Madison	68	21	43.8	3.59	T.
Marengo	71	21	43.6	3.93	T.
Marion	72	15	41.1	2.90	T.
Markle	71	13	39.0	3.10	T.
Mauzy	65	15	40.4	1.88	T.
Moores Hill	65	18	41.8	2.86	T.
Mount Vernon	75	22	47.0	4.50	T.
Northfield	70	15	39.0	1.90	T.
Paoli	70	17	44.4	3.46	T.
Princeton	71	18	45.8	3.00	T.
Rensselaer	76	14	41.2	2.51	T.
Richmond	66	17	39.6	1.87	T.
Rochester	70	15	39.2	4.11	T.
Rockville	73	15	42.0	2.03	T.
Rome	75	22	46.8	5.53	T.
Salem	65	18	44.2	2.23	
Scottsburg	69	22	43.3	3.34	
Seymour	68	22	44.4	2.80	
Shelbyville	65	18	41.6	1.99	T.
South Bend	74	13	37.6	2.22	1.5
Syracuse	70	13	38.2	2.82	0.5
Terre Haute	73	18	46.2	2.85	
Valparaiso	74	20	40.2	1.15	T.
Veedersburg	78[d]	18[d]	42.8[d]	1.86	T.
Vevay	64	20	44.4	3.35	
Vincennes	72	18	44.6	2.76	
Washington	69	18	43.0	1.44	T.
Indian Territory.					
Ardmore	78	21	53.9	3.50	
Calvin	......	......	......	2.47	
Durant	82	20	55.0	5.04	
Fairland	79	15	51.2	0.89	
Indian Territory—Cont'd.	°	°	°	*Ins.*	*Ins.*
Fort Gibson	......	......	......	1.05	
Healdton	81	19	53.0	3.75	
Holdenville	80	19	52.8	2.00	
Marlow	84	19	52.8	3.42	
Muskogee	79	16	53.0	1.32	
Okmulgee	83	17	51.0	1.38	
Pauls Valley	83	18	53.4	3.50	
Ravia	78	22	55.1	3.52	
South McAlester	82	19	56.6	3.10	
Tulsa	......	......	......	0.97	
Vinita	79	9	51.0	0.64	
Wagoner	78	16	52.4	1.20	
Webbers Falls	80	19	51.6	1.05	
Iowa.					
Afton	61	0	39.9	3.12	
Albia	65	3	40.0	2.47	
Algona	60	−5	36.4	3.37	T.
Allerton	66	2	41.0	2.35	T.
Alta	61	−4	36.6	3.20	0.4
Alton	63	−6	37.2	3.91	0.5
Amana	60	6	38.4	3.14	T.
Ames	63	−1	38.2	2.43	T.
Atlantic	62	1	38.6	2.54	
Audubon	62	0	37.8	2.42	T.
Baxter	67	0	39.0	2.50	T.
Bedford	62	1	39.2	3.33	T.
Belleplaine	70	6	38.5	2.41	1.0
Bonaparte	68	6	41.1	1.84	
Boone	63	−1	37.8	2.53	T.
Britt	62	−7	35.5	2.86	0.8
Buckingham	......	......	......	3.31	T.
Burlington	70	8	42.0	2.09	
Carroll	64	−1	38.8	2.48	T.
Cedar Rapids	60	7	37.7	2.65	T.
Chariton	65	3	40.6	2.55	
Clarinda	65	3	39.8	3.41	T.
Clearlake	57	−5	35.3	2.20	
Clinton	61	9	37.4	2.48	T.
College Springs	63	4	40.8	3.13	
Columbus Junction	63	7	38.0	2.69	T.
Corning	70	1	39.3	3.46	
Corydon	67	2	41.9	2.17	0.2
Creston	62	1	39.5	3.23	
Cumberland	......	......	......	2.31	
Decorah	62	2	36.7	2.80	
Delaware	58	3	36.0	3.12	
Denison	64[e]	−1	38.4[e]	2.50	T.
Desoto	65	0	39.8	1.43	
Dows	63	−3	36.8	2.75	0.2
Earlham	63	7	38.7	1.98	T.
Elkader	67	4	37.2	2.55	
Elliott	61	3	39.8	1.11	T.
Estherville	63	−12	35.9	4.06	2.0
Florence	......	......	......	2.54	0.8
Forest City	64	−4	35.8	2.93	T.
Fort Dodge	63	−2	37.1	2.55	0.5
Fort Madison	......	......	......	3.98	......
Galva	60	−3	38.0	3.10	0.9
Gilman	......	......	......	2.61	
Glenwood	65	2	41.8	3.00	
Grand Meadow	58	1	35.4	2.68	0.2
Greenfield	63	−2	39.5	2.85	T.
Grinnell	61	0	38.7	3.26	0.1
Grundy Center	62	0	38.0	2.65	T.
Guthrie Center	66	−1	38.6	2.16	T.
Hampton	66	−1	38.0	2.86	T.
Hancock	61	2	40.2	2.71	
Hanlontown	64	−7	35.8	3.09	T.
Harlan	60	0	38.4	3.06	T.
Hopeville	64	1	40.4	2.92	T.
Humboldt	60	−2	38.5	2.92	T.
Independence	61	3	37.6	3.20	
Indianola	63	1	39.6	3.21	T.
Iowa City	62	6	37.6	2.92	T.
Iowa Falls	62	0	36.3	2.49	T.
Jefferson	64	0	40.2	1.84	T.
Keosauqua	68	5	41.1	2.08	T.
Knoxville	63	3	40.6	2.42	T.
Lacona	......	......	......	2.52	
Larrabee	65	2	37.6	3.74	0.5
Leclaire	......	......	......	2.39	T.
Lemars	64	−6	37.6	4.93	T.
Lenox	62[1]	0	40.2[e]	3.22	
Leon	64	3	41.0	2.46	
Little Sioux	66	−1	41.0	2.60	
Logan	62	1	39.4	3.09	
Maple Valley	......	......	......	3.11	
Maquoketa	64	5	35.7	2.99	
Marshalltown	62	0	40.4	2.77	T.
Mason City	63	−2	37.2	2.65	
Massena	67	0	39.3	2.05	
Monticello	60	5	35.4	2.83	T.
Mountayr	64	2	40.8	2.90	
Mount Pleasant	64	5	39.6	2.65	T.
Mount Vernon	66	5	37.8	0.90	T.
Muscatine	......	......	......	2.28	T.
New Hampton	62	0	36.6	2.38	
Newton	61	−1	37.4	2.97	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Iowa—Cont'd.					
Northwood	62	— 5	35.5	2.78	1.5
Odebolt	61	0	38.9	3.26	.....
Ogden	62	0	38.6	2.24	T.
Olin	.....	7	37.2[f]	2.85	.....
Onawa	69	— 1	40.6	4.26	
Osage	61	— 2	35.8	2.66	0.1
Oskaloosa	62	3	39.7	2.26	T.
Ottumwa	65	6	39.8	2.43	
Pacific Junction	62	1	39.2	2.70	
Pella	62	3	40.5	2.77	T.
Perry	62	1	38.4	3.46	
Plover	61[d]	0[d]	36.6[d]	5.30	T.
Pocahontas	62	— 3	37.5	4.32	1.1
Redoak	65	5	42.8	3.19	
Ridgeway	64	0	38.0	2.93	0.2
Rock Rapids	68	— 6	38.2	3.70	3.5
Rockwell City	68	3	37.9	2.98	1.0
Sac City	60[d]	— 1[d]	38.4[d]	.....	.....
St. Charles	67	0	41.4	3.29	T.
Sheldon	66	—10	38.0	3.94	1.0
Sibley	63	— 9	35.2	4.24	2.2
Sidney	60	— 1	38.8	3.61	
Sigourney	61	4	39.9	2.25	T.
Sioux Center	63	— 8	36.8	3.23	2.0
Stockport	.....	.....	.....	1.93	T.
Storm Lake	61	— 5	36.4	3.00	T.
Thurman	63	2	40.8	4.18	T.
Tipton	61	10	39.7	1.64	
Toledo	62	1	39.0	3.00	T.
Vinton	62	9	38.5	2.90	
Wapello	68	10	41.6	1.96	T.
Washington	64	6	40.4	2.35	
Washta	62	— 4	37.6	2.57	T.
Waterloo	64	4	39.6	2.60	T.
Waukee	60	1	39.4	2.07	0.6
Waverly	61	3	37.2	1.97	T.
Webster City	70	10	38.7	3.67	.....
Westbend	60	— 4	36.4	3.29	T.
Whitten	60	— 1	37.0	1.82	T.
Wilton Junction	65	5	38.6	2.78	T.
Winterset	62	0	38.2	2.57	
Woodburn	63	2	38.5	2.15	T.
Zearing	61	— 1	37.6	2.01	T.
Kansas.					
Abilene	.....	.....	.....	4.30	
Alton	78	7	45.1	2.53	
Anthony	.....	.....	.....	2.62	
Atchison	69	7	45.0	2.86	
Baker	69	6	42.7	3.83	T.
Burlington	73	10	46.5	1.71	
Chapman	78	10	46.5	4.05	
Clay Center	71	7	44.4	2.86	
Colby	76	8	42.3	0.95	T.
Columbus	74	14	48.2	1.21	
Cottonwood Falls	74	9	47.6	2.66	
Cunningham	81	11	47.8	1.80	
Dresden	76	7	44.4	1.06	
Eldorado	75	12	47.2	3.06	
Ellinwood	75	12	45.8	2.70	
Ellsworth	76	8	45.5	2.46	
Emporia	71	10	46.5	2.16	
Englewood	77	14	47.8	3.46	
Enterprise	73	9	45.9	3.23	
Eureka	.....	.....	.....	2.30	
Fall River	74	14	47.4	2.20	
Farnsworth	76	11	44.8	2.16	
Forsha	73	11	47.0	2.35	
Fort Leavenworth	72	9	47.0	3.54	
Frankfort	73	7	42.0	3.64	T.
Garden City	75	13	45.6	3.10	
Gove*[1]	74	10	42.6	1.91	T.
Grenola	75	10	45.7	3.45	
Harrison	68	4	42.8	2.64	
Horton	69	6	44.2	3.70	T.
Hoxie	72[c]	9[c]	43.6[c]	1.57	
Hugoton	74	16	45.4	2.75	
Hutchinson	73	12	46.4	2.42	
Independence	73	15	49.5	1.45	
Iola	71	12	45.7	2.01	
Jewell	71	6	44.5	2.72	
La Crosse	76	10	46.1[c]	2.63	
Lakin	72	11	43.1	3.14	
Larned	76	10	44.6	3.36	
Lebo	73	10	45.4	1.74	
Macksville	75	12	46.1	3.25	
McPherson	75	11	46.8	2.92	
Madison	72	9	46.0	2.06	
Manhattan *b*	73	10	45.6	3.60	T.
Manhattan *c*	74	10	44.2	3.53	T.
Marion	.....	20	.....	2.25	
Medicine Lodge	75	13	47.2	2.43	
Minneapolis	72	9	45.9	2.52	
Moran	73	11	48.2	2.16	
Mounthope	69	.....	.....	2.36	
Neosho Rapids	.....	.....	.....	1.76	
Ness City	75[e]	12[i]	46.7[c]	2.14	
Newton	73	11	46.8	2.49	
Norton	74	7	44.1	1.58	
Kansas—Cont'd.					
Norwich	72	13	47.7	2.30	T.
Oberlin	.....	.....	.....	0.65	
Osage City	73[c]	8[c]	46.2[c]	2.32	
Osborne	.....	.....	.....	2.45	
Oswego	76	14	49.6	1.15	
Ottawa	76	9	47.0	2.57	
Pittsburg	78	13	49.4	1.22	
Pleasanton	72	11	47.7	1.85	
Republic	69	5	42.6	2.48	
Rome	76	15	48.4	2.13	
Russell	73	10	46.0	2.72	
Salina	73	9	45.5	2.38	
Sedan	74	15	47.0	1.78	
Toronto	74[c]	14	46.8	2.33	
Ulysses	74[c]	11[b]	45.0[c]	2.20	
Valley Falls	72	8	46.6	2.39	
Viroqua	72[k]	20[k]	46.2[k]	3.10	
Wakeeney	75	8	45.6	2.74	
Wakeeney (near)	.....	.....	.....	2.81	
Wallace	75	12	43.2	1.35	
Walnut	75	13	49.3	1.12	T.
Wamego*[1]	70	9	43.7	3.08	T.
Winfield	75	12	46.2	2.90	
Yates Center	.....	.....	.....	2.22	
Kentucky.					
Alpha	75	22	50.2	2.90	
Anchorage	68	20	43.6	5.13	T.
Bardstown	77	20	46.4	3.38	
Beattyville	74	19	43.4	2.40	T.
Beaver Dam	74	21	45.5	3.16	
Berea	74	21	48.4	2.50	T.
Blandville	78	20	48.6	5.30	T.
Bowling Green	74	22	48.6	2.23	
Burnside	74	22	47.4	2.67	T.
Cadiz	79	22	49.5	2.02	T.
Calhoun	72	22	49.2	5.66	
Catlettsburg	73	22	46.1	3.64	T.
Earlington	75	22	46.2	3.04	T.
Edmonton	73	21	47.4	3.52	
Eubank	73	20	44.0	2.40	
Falmouth	.....	.....	.....	4.25	
Farmers	71	18	44.0	3.33	T.
Frankfort	67	22	49.1	5.04	
Franklin	75	24	48.3	2.20	
Greensburg	76	21	43.6	2.94	
High Bridge	76	25	46.4	3.14	
Hopkinsville	78	24	48.2	3.57	
Irvington	70	22	46.0	5.98	T.
Jackson	78	21	49.6	1.91	
Leitchfield	72	22	46.4	3.53	
Loretto	77	20	48.1	3.14	
Marion	74	20	49.0	6.64	
Maysville	70	21	43.4	4.23	
Middlesboro	71	23	47.7	1.41	
Mount Sterling	69	22	43.5	4.63	T.
Owensboro	76	23	47.6	4.42	
Owenton	64	14	43.5	4.42	T.
Paducah	78	22	49.6	4.41	T.
Princeton	77	22	48.2	2.12	
Richmond	72	21	45.4	2.55	
St. John	70	20	43.6	3.19	
Scott	65	22	43.0	3.46	T.
Shelby City	75	18	45.6	2.78	
Shelbyville	71	21	43.4	4.67	
Taylorsville	69	21	44.8	5.93	
West Liberty	74	20	45.2	2.46	
Williamsburg	78	22	47.8	1.30	
Williamstown	67	20	44.9	3.92	
Louisiana.					
Abbeville	85	40	63.8	6.14	
Alexandria	83	32	60.6	5.12	
Amite	83	36	62.4	4.60	
Baton Rouge	84	37	62.4	4.22	
Burnside	83	39	63.5	5.37	
Calhoun	81[c]	26[c]	57.8[c]	5.18	
Cameron	79	41	64.5	4.19	
Caspiana	83	28	59.0[f]	5.23	
Cheneyville	.....	.....	.....	4.30	
Clinton	82	35	61.8	5.43	
Collinston	80	28	57.0	4.22	
Covington	81	38	60.6	3.76	
Donaldsonville	85	39	63.2	4.55	
Farmerville	.....	.....	.....	3.89	
Franklin	87	43	64.1	3.97	
Georgetown	84	29	60.2	6.15	
Grand Coteau	85	38	63.5	9.67	
Hammond	81	39	61.9	4.18	
Houma	84	41	63.7	4.47	
Jennings	83	39	62.8	8.98	
Lafayette	83	39	63.6	5.68	
Lake Charles	85	39	63.1	3.67	
Lakeside	82	40	63.2	7.41	
Lawrence	85	46	65.6	3.65	
Libertyhill	85	28	60.4	5.53	
Logansport	.....	.....	.....	5.19	
Melville	83	35	61.6	5.03	
Minden	81	27	57.1	4.43	
Monroe	84	28	60.6	3.60	
Louisiana—Cont'd.					
New Iberia	80	41	64.6[e]	6.45	
Opelousas	83	37	62.2	6.32	
Plain Dealing	82	28	57.8	4.08	
Rayne	84	38	63.8	5.69	
Reserve	80	43	62.7	3.02	
Robeline	85	30	57.7	3.73	
Ruston	85	26	59.6	4.55	
Saint Francisville	84	36	62.2	3.40	
Schriever	87	41	64.0	4.63	
Simmesport	.....	.....	.....	3.41	
Southern University	.....	.....	.....	4.12	
Sugar Experiment Station	82	45	63.6	4.05	
Sugartown	81[c]	38[c]	62.2[c]	5.75	
Maine.					
Bar Harbor	59	10	37.2	7.22	T.
Chesuncook	49	0	31.8	3.15	22.0
Cornish	61	6	33.5	4.48	8.8
Danforth	.....	.....	.....	3.66	5.5
Fairfield	60	6	34.6	3.80	.....
Farmington	60	6	32.4	2.58	8.0
Ft. Fairfield	50	— 4	29.4	3.63	12.5
Gardiner	61	7	34.6	3.95	.....
Grant Farm	.....	.....	.....	1.62	3.5
Greenville	50	— 7	29.8[d]	2.51	12.0
Houlton	57	— 4	30.8	2.25	7.0
Lewiston	64	10	34.4	3.70	5.2
Madison	69	4	35.3	4.60	4.5
Mayfield	50	3	30.5	2.87	20.0
Millinocket	57	1	32.4	4.29	12.1
North Bridgton	63	7	34.6	3.16	8.0
Oquossoc	58	1	29.9	1.55	7.0
Orono	60	2	35.0	4.08	2.3
Patten	52	1	31.4	3.30	1.0
Rumford Falls	58	2	32.8	2.92	14.6
The Forks	.....	.....	.....	2.90	11.5
Thomaston	53[i]	5	34.8[e]	5.02	0.8
Vanburen	48	0	28.6	1.60	6.0
Winslow	60	3	33.8	4.00	2.0
Maryland.					
Annapolis	71	21	46.6	1.06	
Bachmans Valley	69	17	40.5	2.59	T.
Boettcherville	70	14	41.7	1.45	0.5
Cambridge	74	24	46.8	0.66	T.
Charlotte Hall	74	13	43.2	0.44	
Cheltenham	72	13	43.5	0.61	T.
Chestertown	64	20	43.2	1.62	
Chewsville	67	14	40.8	1.73	T.
Clearspring	67	12	40.4	1.76	T.
Coleman	67	21	45.8	1.39	T.
Collegepark	77	12	43.0	.....	T.
Colora	.....	.....	.....	1.75	
Cumberland	.....	.....	.....	1.39	T.
Darlington	65	16	42.0	1.50	
Deerpark	59	10	36.0	1.42	0.5
Easton	69	17	45.3	0.69	
Fallston	68	18	43.0	1.80	T.
Frederick	69	18	43.6	1.55	T.
Grantsville	60	15	37.8	1.90	0.7
Greatfalls	71	14	43.6	0.38	
Greenspring Furnace	66	16	40.5	1.64	T.
Harney	.....	.....	.....	1.77	T.
Jewell	72	19	45.6	0.45	T.
Johns Hopkins Hospital	.....	.....	.....	1.36	
Keedysville	69	17	42.8	1.93	T.
Laurel	69	16	44.0	1.67	T.
McDonogh	68	16	41.0	1.37	
Mount St. Marys College	65	20	43.1	1.92	T.
New Market	67	18	42.4	1.52	T.
Oakland	60	12	37.4	3.40	0.5
Pocomoke City	69	20	47.3	0.39	0.5
Porto Bello	74	19	47.2	0.67	T.
Princess Anne	70	14	44.8	0.53	1.5
Solomons	72	28	47.6	0.40	T.
Sudlersville	70	17	43.8	.....	
Takoma Park	72	17	43.3	1.41	
Van Bibber	65	19	44.0	1.78	T.
Westernport	62	17	40.4	0.16	T.
Woodstock	69	14	43.4	1.35	
Massachusetts.					
Amherst	61	11	36.6	2.06	0.5
Bedford	61	13	38.1	1.84	T.
Bluehill (summit)	61	11	38.4	2.25	T.
Cambridge	63	14	40.4	2.24	
Chestnuthill	65	12	40.3	2.51	
Concord	63	8	36.6	1.98	T.
East Templeton*[1]	56	8	34.8	1.95	T.
Fallriver	60	14	41.0	2.29	
Fitchburg	63	11	37.7	2.04	T.
Framingham	66	13	36.8	1.94	
Groton	62	9	35.2	2.05	T.
Hyannis	.....	.....	.....	3.18	T.
Jefferson	.....	.....	.....	2.87	T.
Lawrence	63	11	38.0	2.11	T.
Leominster	.....	.....	.....	2.12	T.
Lowell	68	4	39.4	2.25	
Ludlow Center	56	5	32.6	1.95	
Middleboro	64	7	39.0	1.87	T.
Monson	60	12	36.7	2.19	0.5

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Massachusetts—Cont'd.	°	°	°	*Ins.*	*Ins.*
New Bedford	59	14	41.4	3.02	
Pittsfield				2.37	1.5
Plymouth	60	17	39.0	2.04	
Princeton				2.46	
Provincetown	62	21	43.3	3.07	
Salem				2.45	T.
Somerset *[1]	66	10	39.3	2.70	
Sterling				2.22	T.
Taunton	63	5	38.4	2.26	
Webster				2.51	
Westboro	65	10	40.0	2.16	T.
Weston	62	9	37.1	2.17	T.
Williamstown	58	10	35.2	1.95	
Winchendon				2.66	T.
Worcester	61	12	38.4	2.16	T.
Michigan.					
Adrian	66	14	39.0	2.54	T.
Agricultural College	71	12	35.8	2.25	0.5
Allegan	70[d]	11[d]	35.4[d]		3.0
Alma	65	11	35.8	1.37	5.0
Ann Arbor	66	14	36.4	3.67	0.1
Arbela	63	11	36.2	3.00	3.0
Baldwin				1.55	1.0
Ball Mountain	62	11	36.4	3.85	1.8
Baraga				1.22	12.0
Bay City	60	5	34.9	2.07	4.5
Benzonia [b]	58	15	34.9		4.5
Berlin	60	10	35.2	2.41	1.0
Big Rapids	58	10	34.3	2.46	T.
Birmingham	68	18	36.7		
Bloomingdale	70	9	37.3	2.26	5.5
Calumet	59	6	32.4	2.82	24.1
Cassopolis	71	14	36.6	3.40	1.5
Charlevoix	56	10	36.5	2.04	
Charlotte	74	12	36.2		T.
Chatham	60	1	30.9	3.32	27.7
Cheboygan	60	5	34.9	1.55	8.0
Clinton	65	13	36.8	2.19	T.
Coldwater	70	11	37.9	2.55	2.0
Concord	66	14	36.0	2.67	T.
Deer Park	52	10	34.0	0.95	10.0
Detour	51	—16	33.5	4.27	8.0
Dundee	72	12	37.8	2.43	T.
Eagle Harbor	55	9	33.8	2.45	
East Tawas	60	3	34.6	1.64	6.0
Eloise	66	12	36.4	1.96	T.
Flint	66	10	35.0	2.26	2.0
Gaylord				2.05	10.2
Gladwin	60	3	33.8	3.30	7.0
Grand Haven	57	14	36.8	2.53	
Grand Marais	53	10	32.2	2.03	2.0
Grape	66	12	36.8	2.51	0.2
Grayling	60	4	32.2	3.55	29.0
Hagar	67	11	36.1	4.61	T.
Harbor Beach	60	10	37.1	1.63	0.5
Harrison	58	6	32.6	2.10	10.0
Harrisville	60	2	34.4	1.93	8.2
Hastings	70	11	36.1	2.53	3.0
Hayes	60	10	37.3	1.00	7.5
Highland				3.50	5.3
Howell	65	10	36.2	2.53	0.6
Humboldt	46	—13	27.2	2.60	26.0
Iron Mountain	60	0	31.6	1.23	8.0
Iron River	59[f]	4[f]	29.6[f]		
Ironwood	58	4	31.2	1.41	14.1
Ishpeming	57	—12	28.8	2.80	28.0
Ivan	62	8	33.2	2.38	18.0
Jackson	69	13	37.0	3.02	0.5
Jeddo	59	11	36.0	1.85	0.5
Kalamazoo	66[g]	15[f]	37.6[g]		
Lake City				0.90	4.0
Lansing	72	14	36.5	2.24	5.5
Ludington	55	13	37.3	1.20	T.
Mackinac Island	52	4	33.6	2.08	9.5
Mackinaw City	49	11	33.3		
Mancelona	50	8	31.7	2.88	27.0
Marine City	51	16	35.6	2.22	T.
Menominee	61	8	35.3	0.36	T.
Mio	60	1	33.2	2.14	14.3
Montague	58	8	36.8	2.57	1.5
Mount Pleasant				1.02	
Muskegon	53[d]	12	37.2	1.73	1.0
Newberry	49			1.07	9.7
Old Mission	58	12	35.6	1.89	7.0
Olivet	69	13	35.2	2.48	5.3
Omer	59	4	33.8		7.0
Onaway	50	2	32.2		
Ovid	70	10	36.9	2.58	1.0
Owosso	70	11	37.4[d]	2.33	2.0
Petoskey	60	9	36.9	1.25	10.5
Pontiac	70	10	37.0	0.88	0.4
Reed City	58	10	36.0	1.36	3.8
Saginaw (W. S.)	69	8	36.4	2.18	4.2
St. Ignace	46	14	32.0		
St. James	53	17[e]	36.1[e]	0.69	5.0
St. Johns	71	12	36.8	2.19	1.0
St. Joseph	67	16	38.8	2.68	T.
Slocum	65	10	35.0	2.01	T.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Michigan—Cont'd.	°	°	°	*Ins.*	*Ins.*
Somerset	68	11	34.9	3.36	T.
South Haven	69	12	36.1	2.46	1.0
Thomaston	55	— 2	30.0	2.10	17.0
Thornville	66	12	38.1	2.33	5.0
Traverse City	60	17	35.3	1.93	11.0
Vassar	65	10	36.2	1.61	0.7
Wasepi	70	10	36.6	2.80	2.5
Webberville	69	13	35.5	2.81	4.5
West Branch					8.0
Wetmore	62	10	32.4	4.00	40.0
Whitefish Point	55	5	34.0	4.23	19.3
Ypsilanti	64	11	35.4	3.49	1.3
Minnesota.					
Albert Lea	62	— 6	36.7	3.02	1.0
Alexandria	59	—20	32.2	2.93	9.0
Amboy	64	—10	37.0	3.85	1.0
Angus	60	—28	28.4	1.08	6.0
Ashby	58	—15	31.6	1.86	12.2
Beardsley	66	—20	35.8	2.41	7.0
Bemidji	61	—30	30.1		
Bird Island	61	—16	34.2	2.54	5.0
Caledonia	59	— 2	34.2	3.88	5.0
Collegeville	57	—14	33.7	2.86	15.4
Crookston	52	—24	29.2	0.99	5.9
Detroit	55	—32	28.8	1.93	12.0
Faribault	62	—10	35.2	2.85	1.5
Farmington	59	— 9	33.9	2.52	8.0
Fergus Falls	59	—15	33.6	2.44	11.5
Glencoe	60	— 9	34.5	2.35	4.0
Grand Meadow	62	— 5	34.5	3.80	1.0
Hallock	62	—27	28.2	1.17	6.2
Halstad	62[c]	—32[c]	31.7[c]	2.59	
Hinckley	63	—22	32.4	2.81	7.0
Hovland	61	—13	29.8	2.91	10.4
Lake Winnibigoshish	56	—20	29.2	2.53	12.0
Leech	58	—22	28.5	2.50	15.0
Little Falls	54	—22	31.2	2.58	12.0
Long Prairie	60	—32	32.0	2.52	9.5
Luverne	60	— 9	36.0	3.34	2.0
Lynd		—19		2.92	2.5
Mankato				3.35	2.0
Mapleplain	59	—15	34.4	2.85	10.0
Milaca	60	—26	32.2[d]	3.45	10.0
Milan	65	—21	34.7	2.74	4.0
Montevideo	62	—17	35.2	2.81	5.0
Mora	60	—26	32.6	3.71	12.0
Morris	61	—20	33.2	2.29	6.0
Mount Iron	58	—21	27.6	1.47	7.0
New London	60	—20	33.6	2.86	8.0
New Richland	68	— 6	36.6	4.63	T.
New Ulm	64	—10	35.7	1.91	2.0
Park Rapids	56	—25	29.2	2.42	14.2
Peterson				2.32	1.5
Pine River	58	—26	30.7	1.93	10.5
Pipestone	59	—11	32.8	3.70	1.0
Pokegama Falls	57	—25	28.7	2.39	14.5
Redwing	71	— 9	34.9	2.24	8.0
Reeds				0.96	1.9
Rolling Green	59	— 9	36.4	3.70	2.0
St. Charles	59	— 1	36.0	2.61	T.
St. Peter	63	— 8	36.6	3.18	1.0
Sandy Lake Dam	60	—20	30.2	3.80	14.0
Shakopee	58	— 9	35.2	2.54	2.5
Stillwater				1.94	10.4
Thief River Falls	55	—30	28.7	3.50	9.5
Tonka				2.07	4.1
Wabasha	64	— 6	36.2	1.57	5.0
Wadena	56	—35	29.8	1.88	13.2
Willow River	60	—25	30.4	3.22	9.7
Windom	64	—16	36.1	4.25	1.0
Winnebago	69	8	38.8	3.28	0.8
Winona	61	0	35.2	2.20	3.8
Worthington	65	—13	33.0	2.21	
Zumbrota	58	— 7	34.2[e]	1.42	T.
Mississippi.					
Aberdeen	76	24	52.5	2.06	
Austin	77	24	53.4	3.05	
Batesville	74	24	53.4	3.15	
Bay St. Louis	81	41	62.7	4.30	
Biloxi	81	40	63.5	3.57	
Booneville	74	18	52.9	2.52	
Brookhaven	82	29	60.0	5.23	
Canton	81	27	59.0	3.21	
Columbia				3.03	
Columbus	78	26	54.8	1.79	
Corinth	73	22	50.8	1.67	
Crystal Springs	84[h]	28	60.5[d]	2.76	
Duck Hill	78	24	54.3	2.47	
Edwards	80	29	60.6	4.22	
Enterprise				1.99	
Fayette	81	30	58.4	6.23	
Fayette (near)				5.73	
Greenville *a*	76	26	56.8	3.44	
Greenville *b*	81	26	56.9	3.49	
Greenwood	81	26	56.0	3.33	
Hattiesburg	81	34	59.8	2.94	
Hazlehurst	83	29	59.8	3.00	
Hernando	79	20	52.8	1.90	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Mississippi—Cont'd.	°	°	°	*Ins.*	*Ins.*
Holly Springs	74	21	52.2	2.59	
Jackson	80	28	58.0	2.89	
Kosciusko	79	25	54.8	2.28	
Lake	80	28	56.5	2.27	
Lake Como	83	31	59.0	2.04	
Laurel	30			1.36	
Leakesville	86	30	61.0	2.48	
Leland				2.57	
Louisville	79	26	57.2	1.93	
McNeill	79	36	60.6	3.44	
Magnolia	83	32	62.0	3.58	
Merrill				3.59	
Natchez	81	31	62.2	4.69	
Nitta Yuma	79[d]	26	56.0[d]	3.40	
Okolona	75	29	55.0	0.90	
Patmos				4.98	
Pearlington	79	40	62.3	5.11	
Pecan	84	38	63.2	3.85	
Pittsboro	78	23	54.6	3.01	
Pontotoc	75	22	53.9	3.13	
Port Gibson	83	29	58.6	4.87	
Porterville	80	26	56.6	3.28	
Quitman	80	30	58.5	2.53	
Ripley	75	17	50.2	1.30	
Shelby	80	25	56.6	3.28	
Shoccoe	80	27	59.8	3.09	
Shubuta				1.23	
Stonington				5.94	
Suffolk	83	30	61.4	5.37	
Swan Lake	80	25	56.0	3.59	
Tchula	82	27	58.8	3.90	
Tupelo	75	28	53.6	2.95	
University	79	22	55.6	2.83	
Utica	75	30	57.7	3.37	
Walnutgrove	78[d]	27[d]	57.9[d]	1.56	
Walthall				2.91	
Watervalley	77	23	55.2	3.75	
Waynesboro	80	32	56.2	1.59	
Woodville	80	32	61.2	7.34	
Yazoo City	80	29	59.0	4.71	
Missouri.					
Albany				2.75	
Appleton City	73	11	46.2	1.50	
Arthur	78	12	47.8	1.45	
Avalon	72	5	44.0	3.01	
Bethany	66	3	41.9	3.17	
Birchtree	79[e]	13[e]	49.2[e]	1.64	
Blue Springs	69	10	44.0[e]	2.06	
Bolivar	75	11	47.8	0.89	T.
Boonville				1.78	
Brunswick	72	6	44.1	1.75	
Caruthersville	79	20	51.3	1.58	
Conception	66	5	42.5	2.73	T.
Darksville	70	8	44.8	1.25	T.
Dean	77	13	50.4	1.97	
De Soto	78	18	47.6	3.05	T.
Doniphan	80	15	48.4	0.77	
Downing				2.54	T.
Eldorado Springs	75	11	48.4	1.13	
Fairport				3.58	T.
Fayette	70	10	44.0	1.69	
Fulton	75	11	45.0	1.82	T.
Gallatin *[1]	70	8	44.6	2.74	
Gano	80	11	48.8	1.61	
Glasgow				2.85	
Goodland	77	11	46.2	2.18	
Gorin				2.15	T.
Grant City	67	4	42.2	2.37	
Harrisonville	71	9	44.2	1.51	
Hazlehurst				2.57	
Hermann				1.70	T.
Houston	77	12	47.8	1.46	
Ironton	78	12	46.2	1.87	T.
Jackson	77	17	48.8	1.62	T.
Jefferson City	75	10	45.8	1.47	
Joplin				0.41	
Kidder	69	6	43.0	2.58	T.
Koshkonong	78	12	49.2	1.95	
Lamar	76	13	49.1	0.79	
Lamonte				1.55	T.
Lebanon	74	10	46.6	1.76	T.
Lexington	71	10	45.7	1.63	
Liberty	72	7	45.7	2.08	T.
Lockwood	72	16	47.6	0.93	
Louisiana	75	10	43.0	1.50	T.
Macon	70	7	44.4	1.75	T.
Marblehill	76	11	47.7	1.27	
Marshall	70	10	45.4	2.53	T.
Maryville	64	4	40.4	3.44	T
Mexico	73	10	44.4	1.68	T.
Mountain Grove	76	10	48.0	1.67	
Mount Vernon	75	10	46.2	0.66	
Neosho	77	13	49.2	1.17	
New Madrid				3.55	
New Palestine	74	13	48.0	1.69	
Oakfield	79	12	47.4	2.99	T.
Olden	79	12	49.3	1.57	
Oregon	65	5	42.6	2.86	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
***Missouri*—Cont'd.**					
Osceola				1.30	
Pine Hill				1.71	
Princeton	65	4	43.8	2.69	
Protem	78	13	50.3	1.98	
Rockport				3.21	
Rolla				1.99	
St. Charles	78	14	46.8	1.78	
St. Joseph				3.14	
Sarcoxie				0.89	
Sedalia	72	11	46.1	1.55	
Seymour	75	9	47.3	1.37	
Sikeston	77	18	49.5	2.60	T.
Steffenville	68	9	43.6	2.35	
Sublett	78	5	44.2	3.35	T.
Trenton	65	8	43.2	3.00	T.
Unionville	66	2	41.1	2.90	0.5
Versailles	80	9	46.8	1.57	
Warrensburg	73	9	47.6	1.34	T.
Warrenton	76	10	43.6	1.74	T.
Warsaw	76	11	46.4	1.10	T.
Wheatland				1.53	
Willowsprings	75	10	46.1	1.70	
Windsor	72	8	46.8	0.74	
Zeitonia	78	11	47.2	1.81	
Montana.					
Absarokee				1.50	8.0
Augusta	74	−28	35.0	0.60	6.0
Billings	70	−13	39.4	1.01	4.5
Boulder	63	−19	31.6	0.20	
Bozeman	58	−14	31.4	0.78	9.8
Butte	55	−8	33.5	0.35	
Canyon Ferry	59	−15	30.2	0.97	9.7
Cascade	69	−21		1.50	10.3
Choteau	75	−24	37.1	0.26	
Clearcreek	69	−16	38.6	1.20	12.0
Columbia Falls	56	−11	30.0	2.47	
Copper				1.21	17.0
Crow Agency	68	−14	36.4	1.05	9.5
Culbertson	65	−17	30.7	0.24	2.5
Dayton	58	5	33.9	1.51	
Decker	70	−18	34.2	0.90	
Deerlodge	57	−22	30.8	0.77	
Dillon	63	−18	34.2	0.69	6.8
Ekalaka	64	−14	34.9	0.23	
Fallon	67	−14	34.2	0.08	0.8
Forsyth	70	−18	36.0	1.10	11.0
Fort Benton	64	−22	34.8	0.50	5.0
Fort Harrison	63	−22	30.8		
Fort Logan	54	−33	25.6	1.08	10.8
Glasgow	67	−24	32.0	0.30	4.0
Gold Butte				1.58	15.0
Graham	68	−16	35.7	0.32	4.2
Grayling	57[e]	−29[e]	24.0[e]	0.90	14.2
Greatfalls	64	−18	36.7	1.25	
Hamilton	60	−9	33.4	0.53	2.5
Highwood				1.20	
Homepark				0.98	11.0
Lakeview				2.30	
Lewistown	81	−11	36.8	0.70	8.0
Livingston	64	−3	38.0	1.20	11.5
Lodge Grass				1.12	11.0
Malta	68	−25	34.1	0.55	5.5
Marysville	58	−18	31.2	3.70	37.0
Missoula	55	1	31.3	0.65	1.0
Nye				0.75	6.3
Ovando	58	−24	27.9	1.60	16.0
Philipsburg	62	−10	32.4	0.96	3.5
Plains	59	−1	32.9	1.03	6.0
Poplar	65	−20	35.1	0.35	3.5
Raymond				0.58	5.5
Redlodge	62	−8	32.2	0.82	12.0
St. Pauls	72	−15	38.2	1.15	11.6
St. Peter	64	−12	36.4	1.46	23.0
Saltese				2.80	26.0
Springbrook	65	−22	34.4	0.65	5.0
Steele	71	−17	38.9	1.52	11.0
Tokna				0.27	2.0
Troy	56	8	33.8	1.27	2.0
Twin Bridges[d]	65	−20	29.4		
Utica	70	−17	34.6	0.50	6.0
Virginia City	57	−8	31.4	0.53	5.6
Warrick				0.90	9.0
Wolf Creek	62	−12	35.0	1.04	9.6
Wolsey	60	−28	27.4	1.30	19.5
Yale	68	−26	32.8	1.70	17.0
Nebraska.					
Agate	70	−5	35.0	0.26	3.2
Agee*[1]	70	−5	36.8	1.35	0.5
Ainsworth	75	−6	39.0[d]	0.36	5.0
Albion	66[1]	−1[1]	36.8[1]	2.23	
Alliance	74	−5	36.8	0.30	1.2
Alma	72	−5	42.6	2.24	
Arapaho				1.10	
Arcadia				0.74	T.
Ashland	66	3	41.7	2.52	T.
Ashton				1.73	T.
Auburn	66	4	43.0	3.37	
Aurora	67	9	42.6[e]	3.00	T.
***Nebraska*—Cont'd.**					
Bartley	80	5	40.8	0.15	
Beatrice	66	5	41.9	2.71	
Beaver	74	6	43.6	1.42	
Bellevue	64	2	42.6	2.93	
Blair	63	−1	41.2	3.19	T.
Bluehill				2.34	
Bradshaw				3.13	
Bridgeport	76	8	41.5	0.22	1.2
Broken Bow	71	3	39.8	0.71	T.
Burchard				3.23	
Burge				0.41	1.9
Burwell				1.21	1.0
Callaway	75	−3	42.8	1.02	1.0
Central City				2.14	T.
Chester				2.85	
Clearwater	71	−6	39.8	1.35	0.5
Cody				0.20	2.0
Columbus	68	1	40.0	2.33	
Crawford				0.60	6.0
Crete	67	3	42.3	2.79	
Culbertson	78	9	42.0	0.83	T.
Curtis	73	5	40.8	0.87	0.5
David City	65	0	41.1	2.36	T.
Dawson	66	3	43.2	3.61	
Dubois				3.27	
Duff				1.30	3.0
Dunning				0.15	1.5
Ericson				2.40	1.0
Ewing				0.96	1.0
Fairbury	70	2	41.8	2.39	
Fairmont	67	2	40.0	2.55	T.
Fort Robinson	74[e]	−5	38.9[e]	0.25	2.1
Franklin	71[e]	4[e]	42.4[e]	2.70	
Fremont	65	0	40.6	3.22	
Fullerton				2.45	
Geneva	68	2	41.5	2.51	T.
Genoa (near)	66	0	41.4	2.55	1.0
Gering	74	5	40.0	0.14	
Gordon				0.20	2.0
Gosper				0.92	T.
Gothenburg	74	−1	41.6	0.95	1.0
Grand Island	68	8	42.1	2.40	T.
Grant	81	4	40.6	0.41	1.0
Greeley				0.40	
Guide Rock				2.84	
Haigler				0.27	T.
Halsey	74	−17	38.8	0.45	1.5
Hartington	72	−8	38.8	3.93	2.0
Harvard	66	1	40.0	2.48	T.
Hastings*[1]	68	−1	42.8	2.35	
Hayes Center	80	4	42.1	1.00	1.0
Hay Springs	70	−4	36.9	0.70	7.0
Hebron	68	5	42.4	2.61	
Hendley				1.61	
Hickman				3.67	
Holbrook				0.76	0.5
Holdrege	69	4	41.6	1.85	T.
Hooper*[1]	63	3	38.9	3.09	
Imperial	78	4	40.4	0.80	2.0
Johnstown				0.55	0.5
Kearney	70	3	42.3	1.45	
Kimball	68	1	37.3	T.	T.
Kirkwood	75	−11	40.5	0.93	1.5
Leavitt	67	2	39.6	3.39	
Level				1.23	0.5
Lexington	72	2	40.4	0.60	
Loup	68	−2	39.6	1.55	
Lynch	76	−10	40.2	1.89	3.0
McCook				1.40	
McCool				2.48	
Madison	65	−2	40.0	2.94	T
Marquette				2.19	T.
Mason				0.95	
Minden	69	4	41.2	2.36	0.1
Monroe				2.71	0.1
Nebraska City	65	4	42.6	3.61	
Nemaha				3.00	
Norfolk	71	−2	39.7	2.45	0.5
North Loup	72	−1	41.0	1.63	0.5
Oakdale	66	−4	38.6	1.69	0.6
Oakland	65	−1	38.8	3.16	
Odell				3.15	
Ord				1.10	
Osceola				1.75	
Palmer				1.80	T.
Palmyra*[1]	68	2	41.6	2.45	
Pawnee City	67	5	42.8	2.95	
Plattsmouth				2.62	
Plymouth	67	9	44.4	2.66	
Purdum	76	−10	39.5	0.50	1.0
Ravenna	70	0	42.3	1.65	0.7
Redcloud				2.20	
Rulo				3.37	
St. Libory				1.98	
St. Paul	69	2	41.8	1.74	0.5
Santee	72	−8	42.0	2.00	1.2
Schuyler				2.56	
Seward	67	2	41.2	4.03	
***Nebraska*—Cont'd.**					
Springview	72	−10	40.6	0.45	1.0
Stanton	68	−2	41.8	3.08	T.
Strang				3.00	
Stratton				0.80	
Stromsburg				1.41	
Superior				2.76	
Syracuse				2.90	
Tablerock				2.94	
Tecumseh	67	−5	41.8	2.95	
Tekamah	67	−1	40.8	3.27	
Turlington	64	3	42.0	2.53	
University Farm	66	3	42.5	2.77	
Wahoo				3.22	
Wakefield	67	−4	40.0	3.26	0.3
Wallace				0.25	
Wauneta				0.58	0.5
Weeping Water				2.62	
Westpoint	70	2	40.4	3.30	T.
Wilber				4.04	
Winnebago	66	−5	38.4	3.62	T.
Wisner				4.15	
Wymore				2.50	
York	67	3	41.6	2.36	T.
Nevada.					
Amos	67	0	35.6	0.73	6.5
Battle Mountain	87	7	40.8	1.00	10.0
Beowawe*[1f]	68	12	42.9		
Carlin*[1]	62	7	32.8	0.40	4.0
Carson City	72	12	36.8	1.02	14.1
Dyer	68	6	36.0		
Eureka	70	10	43.4	1.40	14.0
Fenelon				1.25	12.5
Geyser	66	−8	33.2	0.97	7.7
Golconda*[1]	65	20	38.4	0.93	4.0
Halleck				0.70	7.0
Hazen	69	4	38.0	0.10	1.0
Humboldt	60	18	39.6	0.60	6.0
Lewers Ranch	70	17	40.2	1.99	20.0
Lovelocks	64	0	32.0	0.10	1.0
Martins	78	12	40.1	1.30	13.0
Mill City*[1]	60	0	34.2	0.90	9.0
Morey	65	1	36.2	2.88	21.2
Palisade	68	4	34.0	1.10	11.0
Palmetto	65	2	33.4	1.95	18.0
Pioche	79	−5	34.5	1.13	9.8
Potts	60	−10	28.6	1.65	19.0
San Jacinto	60	1	31.8	1.75	17.5
Tecoma	58	3	34.4	1.40	14.0
Verdi*[1]	59	15	36.7	2.40	24.0
Wabuska	65	10	36.4	0.30	3.0
Wadsworth	76	18	42.4	0.67	6.8
Wood	62	6	35.1	0.68	7.0
New Hampshire.					
Alstead	56	7	33.1	2.51	T.
Bartlett				2.84	12.5
Bethlehem	60	1	30.0	1.84	8.0
Bretton Woods				1.59	
Brookline*[1]	62	4	38.5	2.08	T.
Durham	64	7	36.6	2.90	
Franklin Falls	59	6	34.3	2.61	1.0
Grafton	62	3	32.7	2.10	2.5
Hanover	59	6	33.0	1.65	T.
Keene	63	6	34.6	2.04	T.
Nashua	62	8	37.1	1.42	T.
Newton	63	4	36.8	2.42	T.
North Woodstock				3.59	
Plymouth	55	7	33.2	2.51	5.8
Stratford	62	0	31.0	2.44	7.0
New Jersey.					
Asbury Park	67	21	44.0	1.20	T.
Bayonne	65	18	43.0	1.98	
Belvidere	61	11	40.7	2.78	T.
Bergen Point	64	18	42.6	2.06	T.
Beverly	66	15	42.9	1.93	T.
Bridgeton	68	15	44.5	1.55	
Browns Mills	67	8	39.8	1.63	T.
Canton				1.33	
Cape May C. H.	70	15	45.4	0.89	
Charlotteburg	60	6	38.2	2.38	1.0
Clayton	68	14	42.8	1.95	T.
College Farm	65	15	41.5	2.01	
Dover	59	12	38.4	2.30	1.0
Elizabeth	64	14	42.0	1.78	
Englewood	62	18	41.6	1.75	T.
Flemington	66	15	41.4	2.45	T.
Friesburg	68	15	43.4	1.76	T.
Hightstown	64	15	41.4	2.08	
Imlaystown	67	19	43.9	2.20	T.
Indian Mills	68	11	42.8	1.96	
Lakewood	68	16	42.7	1.44	
Lambertville	65	16	41.7	2.22	T.
Layton	60	8	36.2	1.68	2.0
Moorestown	67	15	42.7	1.87	T.
Newark	64	18	43.2	2.03	T.
New Brunswick	66	18	43.2	1.98	T.
Newton	60	14	38.2	2.86	1.0
Oceanic	68	21	43.8	1.23	
Paterson	66	19	43.8	1.98	0.3

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
New Jersey—Cont'd.					
Phillipsburg	63	15	40.5	2.60	T.
Plainfield	64	15	41.2	2.57	T.
Pleasantville	.....	.....	.....	0.61	T.
Rancocas	.....	.....	.....	2.03	T.
Rivervale	64	10	39.4	2.04	1.0
Somerville	64	14	40.8	2.68	
South Orange	63	18	41.4	2.48	
Sussex	59	14	39.4	1.90	T.
Toms River	70	10	42.2	1.15	T.
Trenton	65	19	44.6	2.06	T.
Tuckerton	64	11	42.2	0.93	
Vineland	68	12	43.0	1.29	
Woodbine	68	12	42.6	0.65	
New Mexico.					
Alamagordo	71	25	50.0[c]	2.75	
Albert	80	19	48.5	4.49	T.
Albuquerque	66	21	44.0	4.70	
Alma	78	22	47.8	5.80	
Alto	.....	.....	.....	4.43	6.5
Artesia	76	21	50.6	1.31	
Bellranch	79	20	46.4	5.24	.....
Bloomfield	72	11	41.6	1.84	1.2
Brice	71	28	51.8	2.56	
Cambray	.....	.....	.....	1.50	
Carlsbad	80[c]	23[c]	52.2[c]	1.43	
Chama	.....	.....	.....	1.86	11.0
Cimarron	72	12	41.5	1.80	0.5
Cliff	76	25	50.2	4.29	
Cloudcroft	53	11	34.4	5.69	6.5
Datil	64[g]	19[g]	40.6[g]	4.29	1.3
Deming	71	26	47.8	2.72	
Dorsey	68	12	40.7	2.16	
Eagle Rock Ranch	63	9	39.4	2.77	7.0
Elizabethtown	55	−5	30.8	2.35	12.0
Elk	71	19	46.4	2.39	T.
Espanola	70	20	42.9	2.98	T.
Fort Bayard	70	19	45.2	3.66	T.
Fort Stanton	66	15	42.5		
Fort Union	78	12	41.8	3.48	T.
Fort Wingate	62	7	39.6[f]	2.70	6.0
Fruitland	64	11	41.7	1.75	T.
Garcia	.....	.....	.....	3.42	T.
Gran Quivira	.....	.....	.....	4.25	0.5
Hillsboro	75	18	47.4	3.61	.....
Hope	.....	.....	.....	2.23	
Laguna	68[h]	18[h]	41.4[h]	3.40	2.5
Lagunita	73	22	45.0	4.79	T.
Lake Valley	.....	.....	.....	2.97	
Las Vegas	72	16	41.1	3.32	2.0
Lordsburg	75	16	48.5	2.93	
Los Alamos	.....	.....	.....	3.82	6.0
Los Lunas	64	25	45.7	1.50	
Luna	61	13	38.6	6.01	T.
Magdalena	.....	.....	.....	2.55	T.
Manuelito	.....	.....	.....	4.14	2.0
Mesilla Park	74	24	51.5	2.14	
Mimbres	.....	.....	.....	4.37	T.
Mineral Hill	.....	.....	.....	4.46	4.5
Mountainair	.....	.....	.....	3.74	5.5
Nara Visa	76	19	47.0	3.87	T
Palma	.....	.....	.....	2.59	5.0
Patterson	.....	.....	.....	2.96	T.
Portales	77	19	48.0	2.25	
Raton	67	10	42.9		
Redrock	.....	.....	.....	3.47	
Rincon	77	21	51.1	1.98	
Rociada	55	9	36.3	4.10	11.0
Rosa	.....	.....	.....	2.47	.....
Rosedale	.....	.....	.....	3.65	4.0
San Marcial	77	24	49.4	4.18	
San Rafael	65	15	40.8	1.71	T.
Socorro	74	25	47.5	2.97	
Springer	67	0	40.6	2.21	
Strauss	.....	.....	.....	2.29	
Taos	67	10	40.4	1.72	2.0
Trampas	.....	.....	.....	5.35	
Tucumcari	75[f]	24[f]	47.2[f]	4.00	
Valley	.....	.....	.....	2.40	
Vermejo	62	10	35.2	1.32	4.5
Weed	.....	.....	.....	3.91	
Whiteoaks	.....	.....	.....	4.13	
Windsor	62	−5	34.8	3.70	.....
New York.					
Adams	58	5	32.4	2.37	11.5
Addison	65	6	37.0	1.22	T.
Akron	.....	.....	.....	2.38	
Amsterdam	62[g]	10	36.6[d]	2.17	0.5
Angelica	55	−2	33.8	1.86	2.5
Appleton	66	15	39.4	2.00	T.
Arcade	61	−9	35.7	3.18	16.3
Athens	61	13	38.6	1.09	1.0
Atlanta	59	6	34.8	1.35	T.
Atwater	.....	.....	.....	1.73	1.4
Auburn	60	8	36.8	1.19	4.0
Avon	59	0	36.4	1.25	2.0
Baldwinsville	59	11	36.0	.....	.....
Ballston Lake	57	9	35.2	2.46	1.5
Bedford	61	13	40.0	1.96	0.8
New York—Cont'd.					
Berlin	65	6	35.5	2.55	T.
Blue Mountain Lake	.....	.....	.....	2.48	7.5
Bolivar	57	0	34.4	2.98	7.0
Bouckville	59	−7	29.9	2.45	6.0
Brockport	59	9	37.2	2.28	5.5
Cape Vincent	54	10	36.4	3.50	5.0
Carmel	59	14	38.2	2.42	1,0
Carvers Falls	57	3	33.6	1.73	.....
Chatham	68	10	37.8	1.58	T.
Chazy	55	8	33.4	1.58	1.5
Coeymans	58	8	37.2	1.27	T.
Cold Spring Harbor	62	15	41.5	2.07	
Cooperstown	56	8	33.1	2.71	3.0
Cortland	59	14	36.8	2.36	0.8
Cutchogue	64	18	43.0	2.05	T.
Dekalb	59	1	33.6	2.14	6.0
De Ruyter	57	5	34.0	2.73	7.9
Elba	55	6	35.5	2.21	3.0
Elmira	64	10	38.3	1.30	2.0
Faust	58	2	29.8	1.45	10.6
Fayetteville	62	10	36.2	1.65	1.0
Fort Plain	58	14	36.8	2.02	1.5
Franklinville	58	−4	34.0	4.35	12.0
Gabriels	58	−1[e]	29.0[e]	0.95	6.0
Gansevoort	.....	.....	.....	3.27	6.0
Glens Falls	54	5	33.6	2.49	3.5
Gloversville	54	9	33.6	3.84	2.8
Greenfield	57	6	34.4	3.29	T.
Greenwich	60[d]	2[d]	34.6[d]	2.50	2.0
Griffin Corners	64	5	32.8	2.48	2.0
Harkness	57	7	33.2	1.33	3.5
Haskinville	.....	.....	.....	2.08	7.7
Hemlock	59	14	37.6	1.00	T.
Hunt	60	1	35.2	2.12	1.8
Indian Lake	62	−10	30.6	1.47	4.5
Ithaca	61	9	36.4	1.34	2,7
Jamestown	57	7	36.0	3.94	6.8
Jeffersonville	60	8	35.0	2.49	3.0
Keene Valley	59	4	33.4	1.66	2.2
Lake George	57	5	36.7	2.28	3.7
Le Roy	61	4	36.2	1.84	2.9
Liberty	52	4	33.4	3.04	1.0
Littlefalls, City Res.	62	8	34.0	2.63	2.5
Lockport	58	15	37.0	2.20	0.6
Lowville	56	1	32.1	1.81	6.5
Lyndonville	.....	.....	.....	2.30	1.0
Lyons	60	9	37.1	2.20	3.2
Middletown	58	16	39.0	2.27	2.5
Mohonk Lake	55	12	37.4	1.98	4.0
Moira	65	5	33.5	2.23	6 0
Mount Hope	66	13	40.6	1.46	0.5
Newark Valley	.....	.....	.....	2.43	3.5
New Lisbon	54	5	32.0	2.51	2.5
North Lake	54	−10	23.1	1.99	7.0
Ogdensburg	58	5	33.4	1.59	T.
Oneonta	67	9	36.6	2.15	1.0
Oswegatchie	.....	.....	.....	1.40	5.5
Otto	69	4	36.6	0.96	0.4
Oxford	57	12	34.8	2.95	4.2
Oyster Bay	77	19	44.1	1.91	
Palermo	.....	.....	.....	4.40	8.2
Perry City	60	−2	34.2	1.78	1.2
Plattsburg	54	8	34.6	1.78	T.
Port Jervis	61	11	37.6	1.84	2.0
Potsdam	63	2	33.6	2.53	8.5
Richland	67	2	36.3	2.05	4.0
Ridgeway	58	14	37.2	2.49	3.1
Ripley	60	14	36.2	5.40	9.0
Romulus	60	11	37.5	0.45	1.5
Salisbury Mills	57	10	34.6	2.26	0.1
Saranac	60	2	30.4	1.69	5.2
Scarsdale	61	14	40.4	1.74	T.
Setauket	60	19	43.7	1.95	T.
Shortsville	60	9	36.6	1.10	1.5
Skaneateles	.....	.....	.....	2.46	T.
Southampton	61	18	42.6	1.62	.....
South Canisteo	59	0	35.0	2.03	1.5
South Kortright	62	6	33.9	2.16	1.4
South Schroon	56	1	31.6	1.84	7.3
Spier Falls	56	6	34.2	2.49	6.2
Straits Corners	65[d]	2[d]	32.9[d]	1.20	2.5
Taberg	69	7	36.8	4.12	4.5
Ticonderoga	67	4	34.8	1.31	2.5
Volusia	59	7	35.8	5.02	5.0
Wappinger Falls	60	15	38.6	2.56	3.0
Warwick	.....	.....	.....	1.71	2.0
Watertown	57	2	34.6	2.06	4.0
Waverly	61	7	35.8	1.90	4.1
Wedgwood	59	6	34.7	1.49	2.0
Wells	59	5	32.3	2.89	8.2
West Berne	67	7	36.4	0.57	1.0
Westfield	59	10	36.8	5.22	2.2
Windham	65	8	35.0	1.01	T.
Youngstown	.....	.....	.....	1.89	1.0
North Carolina.					
Battleboro	.....	.....	.....	0.92	
Beaufort	72	34	56.2	1.12	
Brevard	74	15	47.0	0.18	
North Carolina—Cont'd.					
Brewers	80	15	46.4	0.38	
Bryson City	.....	.....	.....	1.68	
Buck Springs	70	18	43.4	0.05	
Catawba	.....	.....	.....	0.52	
Chalybeate Springs	76	22	51.7	0.60	
Chapelhill	77	24	50.2	1.05	
Currituck	.....	.....	.....	0.92	
Eagletown *[5]	74	19	47.9	0.81	1.5
Edenton	71	26	52.0	1.65	2.0
Fayetteville	79	25	53.8	0.53	
Goldsboro	77	22	49.5	0.75	
Graham	.....	.....	.....	0.54	
Greensboro	73	23	49.0	0.69	
Greenville	.....	.....	.....	0.65	
Henderson	75	22	50.2	0.45	T.
Hendersonville	73	18	47.8	0.38	
Henrietta	76	20	49.9	0.73	
Horse Cove	73	27	49.0	0.88	
Hot Springs	70	28	49.8	.....	
Kinston	80	23	52.1	1.58	
Lenoir	75	15	46.5	0.00	
Lexington	75	16	48.6	T.	T.
Lincolnton	76	20	48.8	0.03	
Linville	62	12	41.6	0.00	
Louisburg	74	17	48.5	0.99	0.2
Lumberton	79	25	53.0	1.23	
Manteo	74	34	55.8	0.30	
Marion	77	19	50.3	0.32	
Marshall	76	21	47.5	0.84	
Moncure	77	18	49.6	2.14	
Monroe	77	18	50.8	0.82	
Morganton	75	17	48.4	0.36	
Mountairy	77	14	46.7	0.30	
Mount Holly	.....	.....	.....	0.85	
Murphy	.....	.....	.....	2.60	
Nashville	78	17	50.2	1.07	T.
Newbern	79[1]	27[1]	54.4[1]	0.74	
Patterson*[1]	70	16	42.1	0.16	
Pinehurst	81	22	54.6	0.02	
Pink Beds	69	5	43.4	0.76	
Pittsboro	77	15	50.0	0.78	T.
Randleman	.....	.....	.....	0.49	
Reidsville	78	19	49.3	0.51	
Rockingham	.....	.....	.....	0.40	
Salem	76	16	47.8	0.50	
Salisbury	77	16	17.0	0.61	
Saxon	72	14	48.0	0.32	T.
Scotland Neck	78	22	52.0	0.69	1.0
Selma	72	20	51.1	0.75	T.
Settle	78	20	50.7	0.60	T.
Sloan	80	25	53.8	1.33	
Snowhill	80	19	52.2	0.54	T.
Southern Pines	78	21	53.3	0.49	
Southport	74	31	56.3	1.22	
Statesville	76	17	48.8	0.35	T.
Tarboro	77	20	51.8	0.80	0.2
Vade Mecum	78	12	45.2	0.18	T.
Washington	78	21	52.8	0.50	T.
Waynesville	70	20	47.6	0.84	
Weldon	77	15	47.6	1.37	1.2
Whiteville	80[g]	25[g]	52.0[g]	1.35	
North Dakota.					
Amenia	65	−27	31.1	1.65	12.5
Ashley	65	−20	29.0	2.27	12.0
Beriin	69	−30	32.0	1.82	14.5
Bottineau	61	−15	28.4	0.63	6.5
Cando	60	−26	28.2	1.38	11.5
Dickinson	65	−15	33.0	1.31	13.0
Donnybrook	69	−26	31.6	1.79	12.7
Edgeley	69	−27	34.0	1.46	9.0
Edmore	70	−26	29.4	.....	.....
Fargo	64	−27	31.7	.....	7.0
Forman	68	−20	34.8	1.17	6.0
Fort Berthold	73	−22	34.3	1.01	7.0
Fort Yates	73	−21	33.8	1.30	6.7
Fullerton	68	−27	32.8	1.76	17.2
Glenullin	68	−20	33.1	1.67	10.9
Grafton	65	−36	28.6	1.40	6.0
Hamilton	64	−34	27.0	3.06	20.0
Hannah	60	−30	26.0	1.10	10.0
Hillsboro	61	−12	30.8	2.11	18.8
Jamestown	70	−27	34.6	1.93	10.0
Kulm	67	−25	34.2	2.70	24.4
LaFollette	70	−24	31.8	1.68	12.0
Langdon	61	−20	27.6	1.77	15.1
Larimore	66	−27	29.4	1.20	8.5
Lisbon	68[f]	.....	36.8[f]	1.64	12.0
McKinney	64	−30	29.8	1.35	12.5
Manfred	63	−27	29.9	2.07	15.0
Mayville	65	−30	30.8	.....	.....
Melville	67	−23	34.2[i]	.....	.....
Minnewaukon	6[i]	−20[i]	32.6[i]	0.98	8.1
Minot	66	−27	30.9	1.80	13.5
Minto	66	−33	29.6[f]	.....	18.3
Napoleon	70	−25	31.4	1.05	7.0
Oakdale	65	−16	34.7	1.52	12.0
Oriska	71	−23	33.0	1.23	8.1
Park River	65	−28	30.3	1.64	12,7

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
***North Dakota*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Pembina	68	—29	27.2	0.75	7.5
Portal	60	—16	29.3	1.16	8.0
Power	68	—33	31.8	1.50	14.0
Pratt	65	—32	30.5	1.79	14.0
Rolla	57	—21	27.8	2.00	12.1
Sentinal Butte	68	—15	37.4	0.32	2.2
Steele	67	—23	31.3	1.00	10.0
University	64	—35	30.4	2.35	6.0
Wahpeton	66	—26	33.5	1.53	7.0
Walhalla	63	—38	28.0	1.98	14.0
Willow City	62	—25	28.4	......	......
Wishek	68	—25	31.1	2.13	12.0
Ohio.					
Akron	61	18	38.6	1.85	1.0
Amesville	64	16	41.4	3.00	T.
Atwater	......	......	......	2.46	1.5
Bangorville	60	16	37.8	2.44	T.
Bellefontaine	65	13	38.3	1.47	T.
Benton Ridge	65	17	39.2	2.96	0.2
Bladensburg	60	13	38.2	2.09	T.
Bowling Green	68	13	38.4	3.28	0.5
Bucyrus	60	15	37.4	1.98	T.
Cadiz	60	16	38.8	3.02	0.4
Cambridge	64	16	39.3	2.69	
Camp Dennison	65	20	41.7	2.92	T.
Canal Dover	60	16	37.7	2.04	0.5
Canton	59	18	37.6	2.11	0.7
Cardington	60	16	38.2	2.05	0.3
Chillicothe	71	23	44.5	3.22	
Circleville	65	20	40.4	2.43	T.
Clarington	62	18	41.2	3.49	T.
Clarksville	63	22	42.0	2.40	
Cleveland *a*	62	20	39.5	3.62	11.1
Cleveland *b*	62	20	38.2	2.43	4.0
Coalton	65	16	42.0	3.29	T.
Colebrook	68	11	37.4	2.95	2.0
Dayton	63	19	41.2	2.12	T.
Defiance	68	12	38.5	3.17	0.2
Delaware	61	16	38.8	1.90	0.3
Demos	58	17	39.2	3.04	0.2
Findlay	65	17	39.6	2.58	T.
Frankfort	65	19	41.6	2.90	T.
Fremont	66	18	39.2	2.80	T.
Garrettsville	61	13	37.8	2.97	2.1
Granville	63	17	39.4	2.88	T.
Gratiot	62	17	39.6	2.69	0.7
Green	68	20	43.8	4.34	T.
Greenhill	61	10	36.7	1.98	0.3
Greenville	65	18	40.0	2.14	T.
Hedges	69	12	39.2	2.64	T.
Hillhouse	62	17	38.5	2.92	2.0
Hiram	60	14	37.6	2.80	3.0
Hudson	60[j]	13	36.4[e]	2.54	......
Ironton	71	21	45.2	3.64	T.
Jacksonburg	64	18	42.3	2.30	
Killbuck	59	17	38.4	2.37	T.
Lancaster	64	20	41.2	2.59	0.3
Lima	67	20	39.4	2.13	T.
McConnelsville	63	17	40.7	2.80	0.2
Manara	61	19	40.0	2.40	T.
Mansfield	......	......	......	2.90	T.
Marietta	64	21	42.6	3.14	
Marion	62	18	39.4	1.63	T.
Medina	62	17	37.8	2.40	1.0
Milfordton	61	15	38.1	2.20	T.
Milligan	63	15	39.4	3.01	T.
Millport	61	10	37.5	2.08	0.2
Montpelier	68	15	40.0	2.52	1.0
Napoleon	69	15	40.0	3.82	0.5
Nellie	61	18	38.8	3.21	0.1
New Alexandria	64	15	40.3	2.72	T.
New Bremen	66	16	39.8	2.17	0.5
New Richmond	65	25	43.7	3.84	T.
New Waterford	59	14	37.8	2.29	T.
North Lewisburg	64	17	39.4	1.75	
North Royalton	60	17	37.4	2.72	7.0
Norwalk	63	15	38.3	3.20	1.0
Oberlin	64	16	38.6	2.09	T.
Ohio State University	63	17	39.2	1.77	T.
Orangeville	60	11	35.2	2.03	T.
Ottawa	67	15	38.3	2.33	T.
Pataskala	63	17	39.4	2.61	0.4
Philo	63	18	40.8	2.84	T.
Plattsburg	60	20	40.0	2.24	T.
Pomeroy	68	21	42.3	2.29	T.
Portsmouth	67	22	43.0	3.67	T.
Pulse	61	20	41.4	3.34	T.
Rittman	64	15	38.1	1.85	T.
Rockyridge	64	16	38.6	2.82	0.2
Shenandoah	62	11	36.8	2.17	0.4
Sidney	62	18	40.7	1.86	0.2
Somerset	62	19	41.0	2.98	T.
South Lorain	65	14	39.2	2.19	1.3
Springfield	......	......	......	2.07	......
Thurman	66	12	43.2	3.18	T.
Tiffin	64	16	38.9	2.95	0.5
Toledo (St. Johns College)	65	15	38.2	3.27	1.1
Upper Sandusky	65	17	40.8	2.24	T.
***Ohio*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Urbana	62	16	39.2	1.84	T.
Vickery	65	15	38.4	2.52	0.5
Warren	62	14	38.0	2.38	1.3
Wauseon	67	11	36.9	3.58	0.4
Waverly	66	18	42.4	3.82	T.
Waynesville	63	21	41.3	1.98	
Wellington	63	17	39.4	2.37	T.
Willoughby	......	......	......	2.92	
Wilson	65	16	41.2	3.77	T.
Wooster	61	16	39.4	2.04	0.2
Zanesville	......	......	......	2.65	T.
Oklahoma.					
Alva	80	18	52.0	2.78	
Arapaho	80	17	50.8	4.15	
Blackburn	82[h]	22[h]	51.4[h]	2.10	
Chandler	85	17	53.8	1.42	
Cloud Chief	82	17	51.6	3.60	
Enid	79	12	50.2	2.50	
Erick	82	25	51.3	5.11	
Fort Reno	80	12	54.0	3.83	
Gage	74	14	46.0	2.42	
Grand	80	......	......	2.57	
Guthrie	82	16	52.1	2.12	
Harrington	79	14	48.9	5.28	
Hennessey	80	17	52.8	1.79	
Hobart	81	20	52.4	4.17	
Jenkins	77	15	48.8	2.12	
Kenton	71	15	45.7	1.70	
Kingfisher	82	19	51.7	2.87	
Luther	83	......	53.7[d]	2.15	
McComb	80	15	51.6	1.53	
Mangum	84	20	54.0	3.70	
Meeker	85	16	52.4	0.30	
Newkirk	76	16	50.2	2.80	
Norman	82	15	52.8	2.63	
Okeene	80	17	50.3	2.69	
Perry	82	15	50.8	1.98	
Sac and Fox Agency	80	18	53.0	1.39	
Shawnee	81[c]	18[c]	54.6[c]	1.75	
Stillwater	83	16	49.0	1.57	
Taloga	80	11	44.8[e]	2.20	
Temple	85	18	53.4	4.32	
Watonga	79	15	51.4	2.25	
Waukomis	80	18	52.4	2.55	
Weatherford	78	16	48.8	3.31	T.
Whiteagle	80	15	49.6	3.27	
Woodward	......	......	......	1.04	
Oregon.					
Alba	......	......	......	1.21	
Albany	......	......	......	2.43	
Alpha	67	26	45.5	6.78	1.0
Arlington	60	20	39.1	0.57	3.0
Ashland	74	24	44.6	1.08	4.7
Astoria	59	31	46.9	5.54	
Aurora (near)	67	28	42.0	2.76	
Bay City	72	29	46.8	7.52	T.
Beulah	63	10	34.9	0.30	3.1
Blackbutte	54	27	39.0	5.40	
Blalock	60	24	11.9	0.47	2.0
Bullrun	......	......	......	5.08	T.
Burns	62	12	36.1	0.81	12.0
Carlton	67	26	41.0	2.20	
Cascade Locks	72	28	42.9	5.27	8.5
Coquille	......	......	......	5.12	
Corvallis	64	28	42.4	3.05	T.
Dale	......	......	......	1.65	6.5
Dayville	69	14	38.5	1.14	4.2
Doraville	68	29	43.5	3.33	2.5
Drain	67	28	44.8	3.79	
Echo	61	19	39.8	0.59	3.5
Ella	60	20	41.4	0.50	4.0
Eugene	62	28	43.0	2.78	
Fairview	81	27	49.2	6.41	T.
Falls City	60	26	40.0	5.64	T.
Forestgrove	68	23	42.4	3.44	
Gardiner	69	33	48.2	7.14	
Glenora	61	26	43.0	6.74	1.0
Gold Beach	73	31	46.4	6.18	
Government Camp	65	13	38.1	5.83	26.0
Granite	......	......	......	1.67	......
Grants Pass	72	19	41.0	2.53	T.
Grass Valley	60	12	36.6	0.85	6.0
Heisler	58	13	36.9	0.28	T.
Heppner	63	21	40.6	......	......
Hood River	59	19	41.3	2.04	7.0
Huntington	62	9	37.0	1.58	8.0
Jacksonville	75	23	41.8	1.27	0.1
John Day	70	12	39.8	1.40	6.0
Joseph	60	10	36.5	1.20	10.2
Kerby	71	22	42.3	4.80	T.
Klamath Falls	72	16	39.0	0.35	2.5
Lagrande	64	18	39.0	1.25	7.0
Lakeview	66	10	36.4	0.63	9.0
Lonerock	69	15	40.0	0.92	8.0
McKenzie Bridge	71	21	41.8	6.29	2.5
McMinnville	68	26	43.4	2.57	T.
Marshfield	75	28	46.2	6.00	
Meacham	......	......	......	4.45	14.5
***Oregon*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Mill City	73	21	42.0	3.71	T.
Monroe	63	27	42.8	3.61	
Mount Angel	67	27	43.6	3.17	
Nehalem	......	......	......	7.34	0.1
Newport	71	34	48.0	5.43	
Odell	......	......	......	0.66	......
Ontario	......	......	......	0.30	4,0
Paisley	60	15	34.4	......	......
Pendleton	61	19	38.2	1.09	5.5
Port Oxford	74	35	49.2	6.51	
Prineville	66	12	36.0	0.21	......
Riverside	82	6	33.2	0.54	4.0
Salem	65	29	43.1	2.26	
Silverlake	68	7	33.8	0.23	1.0
Sparta	64	19	36.8	1.20	12.0
Stafford	67	27	43.1	3.04	T.
The Dalles	58	24	40.8	0.84	4.7
Toledo	74	28	47.0	5.74	
Umatilla	65	19	40.1	0.48	2.7
Vale	63	11	36.2	......	3.0
Van	......	......	......	1.22	10.0
Vancycle	65	16	37.4	1.36	7.0
Wallowa	61	9	35.7	1.57	6.5
Wamic	67	20	39.6	1.32	11.0
Warm Spring	62	14	38.2	0.17	1.0
Weston	64	12	37.4	1.57	14.0
Pennsylvania.					
Aleppo	61	11	39.6	3.15	0.5
Altoona	61	13	36.4	2.28	T.
Beaver Dam	......	......	......	2.78	
Bellefonte	62	16	40.6	2.90	5.0
Brookville	......	......	......	3.72	
Browers	......	......	......	2.32	
California	62	19	42.4	2.27	T.
Cassandra	60	12	35.8	2.73	2.0
Centerhall	60	12	36.6	2.43	2.6
Clarion	......	......	......	3.50	2.6
Claysville	61	16	39.4	2.83	T.
Coatsville	66	16	41.6	2.16	T.
Confluence	......	......	......	3.68	
Davis Island Dam	......	......	......	2.50	
Derry	61	12	39.4	2.87	T.
Doylestown	......	......	......	3.02	
Dushore	62	10	34.2	1.08	1.8
East Mauch Chunk	62	13	39.3	2.68	0.8
Easton	63	17	40.6	2.52	T.
Ellwood Junction	......	......	......	2.16	......
Emporium	59	12	36.8	2.04	1.2
Ephrata	65	16	40.8	2.81	
Everett	66	9	36.8	1.69	0.5
Forks of Neshaminy	......	......	......	2.20	
Franklin	60	11	37.9	3.57	T.
Freeport	......	......	......	2.95	......
Gettysburg	67	15	41.0	2.18	T.
Girardville	......	......	......	3.01	2.0
Gordon	61	11	37.2	2.98	T.
Greensboro	......	......	......	2.94	T.
Greenville	62	14	37.8	1.90	1.0
Hamburg	59	15	40.2	2.59	T.
Hanover	67	19	43.3	2.19	T.
Herrs Island Dam	......	......	......	2.66	T.
Huntingdon	61	13	38.8	2.43	0.5
Indiana	58	11	37.8	3.69	0.3
Irwin	68	10	41.6	2.67	T.
Johnstown	62	18	39.7	3.65	T.
Keating	......	......	......	2.49	......
Lansdale	......	......	......	2.40	
Lawrenceville	62	8	36.3	2.35	1.2
Lebanon	65	17	41.1	2.69	T.
Leroy	59	7	36.1	1.60	2.8
Lewisburg	65	14	39.0	2.03	0.5
Lockhaven	63	15	39.0	2.17	1.0
Lock No. 4	......	......	......	2.50	T.
Lycippus	61	15	40.1	2.36	0.5
Marion	65	17	39.8	2.09	T.
Mifflintown	60	13	38.2	2.25	T.
Milford	62	10	37.2	2.07	2.9
Montrose	55	10	35.0	1.63	2.0
New Germantown	67	13	40.2	2.22	
Ottsville	......	......	......	2.97	
Parker	......	......	......	2.56	0.6
Philadelphia	65	23	45.6	2.05	T.
Pocono Lake	54	5	33.8	2.25	3.0
Point Pleasant	......	......	......	2.67	
Pottsville	......	......	......	2.73	
Reading	66	19	41.9	2.76	T.
Renovo	......	......	......	2.00	
Saegerstown	59	9	37.3	3.29	2.0
St. Marys	60	10	34.1	3.07	4.5
Seisholtzville	......	......	......	2.82	
Selinsgrove	66	14	39.2	2.40	T.
Shawmont	......	......	......	1.76	
Skidmore	59	10	38.1	2.20	T.
Smiths Corners	......	......	......	2.91	
Somerset	56	13	36.5	3.05	1.6
South Eaton	62	13	38.8	1.51	1.0
Springdale	......	......	......	2.97	T.
Springmount	......	......	......	2.86	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Pennsylvania—Cont'd.	°	°	°	*Ins.*	*Ins.*
State College	58	13	36.8	2.65	1.0
Swarthmore	65	16	43.0	1.92	
Towanda	63	12	37.4	1.34	1.0
Uniontown	64	19	41.2	3.00	T.
Warren	60	7	36.0	3.45	5.3
Westchester	65	18	43.0	2.18	
West Newton	......	......	......	2.59	T.
Wilkesbarre	60	15	39.6	1.44	T.
Williamsport	61	17	39.5	2.38	0.5
Rhode Island.					
Bristol	59	16	42.1	2.13	
Kingston	63	12	39.6	4.23	
Narragansett	63	16	41.2	3.36	
Pawtucket	67	18	43.0	1.78	
Providence *a*	63	16	41.8	1.84	
South Carolina.					
Aiken	80	29	56.5	1.99	
Allendale	86	34	59.2	1.10	
Anderson	77	27	53.8	2.06	
Barksdale	79	25	52.2	0.92	
Batesburg	78	29	54.5	1.29	
Beaufort	79	34	60.0	1.34	
Bennettsville	80	28	54.5	1.11	
Blackville	82	29	56.2	1.28	
Blair	......	......	......	1.28	
Bowman	81	29	55.2	1.60	
Calhoun Falls	......	......	......	1.26	
Camden	......	......	......	1.12	
Chappell	......	......	......	1.54	
Cheraw	80	26	51.8	1.10	
Clarks Hill	79[e]	28[e]	54.7[d]	2.23	
Clemson College	75	24	52.6	1.49	
Conway	81	30	55.4	1.30	
Dillon	80	25	53.6	1.45	
Due West	76	30	56.7	1.67	
Edisto	......	......	......	1.65	
Effingham	......	......	......	1.05	
Enoree	......	......	......	1.28	
Florence	78	27	54.4	1.27	
Gaffney	90	24	53.0	0.85	
Georgetown	82	29	57.8	1.20	
Greenville	74	21	48.5	1.44	T.
Greenwood	74	28	51.6	1.83	
Heath Springs	70	26	49.3	1.18	
Kingstree	78	33	53.2[e]	1.30	
Liberty	73	23	51.9	2.41	
Little Mountain	78	26	55.4	1.55	
Newberry	77	28	53.0	1.71	
Pelzer	......	......	......	1.59	
St. George	80	30	55.6	0.00	
St. Matthews	75	30	53.8	1.45	
St. Stephens	......	......	......	1.14	
Saluda	79	27	54.4	1.26	
Santuck	78	25	53.3	0.84	
Seivern	81	21	52.2	1.44	
Smiths Mills	......	......	......	1.00	
Society Hill	77	27	50.8	1.33	
Statesburg	80	28	56.2	1.23	
Summerville	81	30	57.2	1.46	
Sumter	81[d]	26[d]	57.0[d]	1.25	
Trenton	80	28	54.6	1.83	
Trial	80	31	55.8	1.06	
Walterboro	84	30	58.8	1.62	
Winnsboro	75	28	53.4	0.66	T.
Winthrop College	75	26	53.0	0.95	
Yemassee	79	29	56.0	1.61	
Yorkville	78	28	54.5	1.14	
South Dakota.					
Aberdeen	70	−24	36.1	1.73	8.0
Academy	71	− 8	40.0	0.63	0.8
Alexandria	72	−11	37.8	1.56	T.
Armour	76	− 9	40.2	1.39	......
Ashcroft	62	−11	32.2	1.00	10.0
Bowdle	70	−20	34.2	0.98	6.0
Brookings	65	−13	35.0	2.45	1.1
Canton	67	−12	37.4	3.64	2.0
Centerville	68	− 9	38.4	2.91	9.1
Chamberlain	73	−10	40.8	0.71	0.5
Clark	67	−12	36.8	2.14	7.5
Doland	67	−18	34.2	1.56	4.0
Elkpoint	73	− 9	39.9	3.90	3.0
Fairfax	72	− 9	42.2	1.27	T.
Farmingdale	......	......	......	0.67	5.0
Faulkton	67	−24	35.3	1.23	11.0
Flandreau	64	− 8	35.4	3.44	3.0
Forestburg	70	−14	36.4	1.54	1.0
Fort Meade	71	−12	37.3	0.64	......
Gannvalley	70	−12	38.4	0.49	1.0
Grand River School	73	−24	33.9	1.12	8.0
Greenwood	75	− 9	41.6	1.70	1.0
Highmore	67	−17	36.4	1.29	7.0
Hotch City	73	−17	39.0	0.46	2.0
Howell	68	−22	35.2	1.21	6.9
Howard	68	−11	37.4	1.86	......
Ipswich	68	−27	34.4	2.34	18.0
Kidder	68	−23	33.0	1.94	10.0
Kimball	70	−10	38.3	0.42	......
Leola	67	−24	33.8	1.55	12.5

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
South Dakota—Cont'd.	°	°	°	*Ins.*	*Ins.*
Marion	67	− 7	37.8	3.52	......
Mellette	76	−26	34.8	......	
Menno	70	−10	39.0	2.13	1.0
Milbank	67	−20	35.3	2.85	6.0
Mitchell	72	−10	38.8	1.56	1.0
Oelrichs	73	−14	35.9	0.60	6.0
Pine Ridge	71	− 7	37.3	0.30	3.0
Ramsey	68	−14	35.4	3.00	2.0
Redfield	69	−23	34.4	1.61	9.0
Rosebud Agency	70	− 5	39.4	0.47	2.8
Sioux Falls	67	− 9	38.5	3.45	1.0
Spearfish	68	− 7	39.0	0.70	7.0
Stephan	66	−18	37.2	0.90	2.5
Tyndall	72	− 7	40.6	1.56	0.3
Vermillion	68	− 7	39.6	3.11	1.0
Watertown	64	−14	33.6	1.97	2.7
Wentworth	64	− 9	36.3	1.78	0.6
Whitehorse	70	−25	36.2	0.62	6.2
Woolsey	......	......	......	1.34	5.0
Tennessee.					
Andersonville	72	20	48.4	2.70	T.
Ashwood	75	21	50.2	1.15	
Benton	74	23	50.2	1.15	
Bluff City	......	......	......	1.06	
Bolivar	74[i]	29[h]	49.8[i]	1.90	
Bristol	68	21	45.0	1.07	
Brownsville	75	22	51.2	1.20	
Byrdstown	78	23	51.2	3.45	
Carthage	72	22	48.8	2.52	
Cedar Hill	76	21	49.4	3.60	T.
Celina	......	......	......	3.47	
Charleston	......	......	......	0.68	
Clarksville	74	22	49.2	3.59	
Clinton	......	......	......	0.93	
Covington	74	21	51.4	3.40	
Decatur	74	22	49.9	1.02	
Dickson	76	21	48.8	2.84	
Dover	80	23	50.1	3.20	
Dyersburg	76	21	50.2	3.45	
Elizabethton	76	19	47.8	1.05	T.
Erasmus	73	18	45.9	1.91	T.
Florence	72	23	50.3	1.80	
Franklin	75	23	49.0	1.65	T.
Greeneville	74	23	47.8	1.02	
Halls Hill	......	......	......	1.01	
Harriman	70	24	48.4	1.05	
Hohenwald	76	17	48.4	1.64	
Iron City	76	21	50.8	0.85	
Isabella	70	23	49.2	1.07	
Jackson	77	22	53.2	1.65	
Johnsonville	76	21	49.3	4.40	
Jonesboro	70	20	45.7	0.23	
Kenton	77	21	50.2	3.23	T.
Kingston	......	......	......	1.18	
Lafayette	74	21	47.4	3.65	
Leadvale	......	......	......	0.97	
Lewisburg	76	23	51.6	0.99	
Liberty	......	......	......	4.70	
Loudon	......	......	......	0.70	
Lynnville	71	22	49.2	0.83	
McGee	......	......	......	1.09	
McMinnville	75	22	50.6	1.31	T.
Maryville	74	24	50.6	1.28	
Milan	74	26	48.4	4.59	
Newport	68	24	47.0	1.15	
Palmetto	76	21	51.4	0.71	
Pope	77	21	52.0	1.80	
Rogersville	71	22	47.4	1.12	
Rugby	75	20	45.6	2.67	T.
Savannah	74	21	51.1	0.89	
Sewanee	69	18	48.8	1.77	
Silver Lake	67	20	43.2	1.07	T.
Springdale	72	20	46.9	1.15	
Springville	76	22	49.2	4.75	T.
Tazewell	......	......	......	0.75	
Tellico Plains	76	23	51.0	0.93	
Tracy City	69	18	47.2	1.82	
Trenton	77	21	50.6	5.47	
Tullahoma	71	22	49.7	1.07	
Union City	78	20	51.0	1.26	
Walling	......	......	......	1.63	
Waynesboro	72	21	50.1	1.53	
Wildersville	73	22	50.3	2.09	
Texas.					
Alvin	......	......	......	4.54	
Arthur	......	......	......	3.40	
Austin	81	37	62.4	2.55	
Ballinger	89	30	57.2	0.83	
Beaumont	90	33	66.1	5.49	
Beeville	90	44[h]	65.2[d]	2.20	
Big Spring	88	24	56.6	1.74	
Blanco	85	33	59.8	3.16	
Boerne	80	33	59.9	4.50	
Bonham	79	24	59.0	3.82	
Booth	......	......	......	3.79	
Bowie	82	22	55.4	2.78	
Brazoria	82	42	65.6	5.85	
Brenham	84	37	63.0	7.45	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Texas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Brighton	83	47	68.0	4.87	
Brownwood	81	28	57.5	1.87	
Channing	75	19	47.1	4.86	
Childress	85	20	52.0	4.25	
Clarksville	80	24	55.0	4.90	
Claude	......	......	......	0.47	
Claytonville	80	21	55.0	1.63	
Coleman	90[d]	28[d]	62.2[d]	0.90	
Colorado	85	23	55.8	1.74	
Columbia	82	40	65.5	5.63	
Columbus	......	......	......	5.55	
Corsicana	81	28	59.2	3.41	
Crockett	84	33	62.7	6.40	
Cuero	90	42	66.6	3.96	
Dallas	83	25	56.8	3.75	
Danevang	84	41	65.4	10.60	
Decatur	......	......	......	2.10	
Dialville	80	28	59.8	3.93	
Duval	85	33	62.0	4.02	
Eagle Pass	90	42	62.0	2.77	
Fort Brown	85	51	71.4	5.32	
Fort Clark	85	42	63.2	3.25	
Fort Davis	73	27	51.4	3.19	......
Fort McIntosh	80	44	64.3	5.01	
Fort Ringgold	96	48	71.3	3.01	
Fort Stockton	86	29	54.4	1.69	
Gainesville	......	......	......	3.84	
Georgetown	85	33	61.3	2.67	
Gonzales	......	......	......	4.64	
Graham	89	23	55.4	2.85	
Grapevine	......	......	......	3.66	
Greenville	80	25	55.3	4.48	
Hale Center	68	20	47.8	2.93	
Hallettsville	84	41	65.4	5.83	
Haskell	83[d]	35[d]	56.2[d]	1.25	
Hearne	87	35	61.8	3.68	
Hempstead	......	......	......	5.98	
Henrietta	87	23	54.2	3.45	
Hereford	73	24	47.8	4.35	
Hewitt	......	......	......	3.86	
Hillsboro	81	27	59.3	2.35	
Hondo	84	40	65.3	2.23	
Huntsville	83	33	59.6	6.11	
Jefferson	80	28	58.0	4.42	
Jewett	84	32	58.6	4.17	
Junction	......	......	......	1.06	
Kaufman	81	27	59.0	2.45	
Kent	76	32	53.0	1.90	
Kerrville	85	36	60.6	2.09	
Knickerbocker	87	29	57.4	1.39	
Kopperl	......	......	......	2.28	
Lampasas	83	32	58.2	1.48	
La Para	......	......	......	1.86	
Liberty	86	38	65.2	4.70	
Llano	83	42	62.6	0.05	
Longlake	......	......	......	3.58	
Longview	88	28	57.5	5.56	
Luling	84	38	62.4	4.35	
Mann	81	29	58.3	2.75	
Marlin	84	32	60.5	3.40	
Menardville	......	......	......	1.50	
Mexia	81	30	58.3	2.23	
Miami	78	21	48.9	4.25	
Mobeetie	80	14	52.0[f]	1.82	
Mount Blanco	82	16	50.6	2.39	
Mount Pleasant	81	26	58.2	3.71	
Nacogdoches	83	29	60.4	10.16	
New Braunfels	83	39	62.8	3.94	
Panter	......	......	......	3.14	
Paris	81	25	56.4	3.28	
Pearsall	85	44	65.6	2.72	
Port Lavaca	85	41	64.2	6.38	
Quanah	......	......	......	4.35	
Rhineland	90	19	54.0	2.25	
Riverside	......	......	......	4.90	
Rockland	85	40	65.2	5.32	
Rockport	80	54	67.0	5.66	
Runge	......	......	......	4.64	
Sabinal	89	40	62.6	1.90	
San Marcos	84	37	60.8	4.10	
San Saba	85[d]	30	59.4[b]	1.69	
Santa Gertrude	......	......	......	3.01	
Seymour	90	21	54.0	3.72	
Sherman	78	24	56.6	3.45	
Sonora	84	31	57.4	1.58	
Sugarland	87	40	65.0	3.66	
Sulphur Springs	81	25	58.3	4.62	
Temple	84	29	58.6	2.30	
Texline	......	......	......	3.86	T.
Trinity	85	34	63.0	4.47	
Tyler	80	27	57.6	3.89	
Valley Junction	......	......	......	5.02	
Victoria	85	41	66.2	7.47	
Waco	......	......	......	3.33	
Waxahachie	83	25	57.1	4.23	
Weatherford	80	24	56.0	3.71	
Wichita Falls	......	......	......	4.00	
Willspoint	88	25	58.3	3.88	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Utah.					
Alpine				1.13	6.0
Alta				2.13	44.5
Aneth	68	16	43.9	1.96	
Beaver	70	10	39.8	0.85	
Blacksmith Fork				1.00	9.0
Castledale	65	5	35.0	2.55	
Castle Rock				0.30	7.0
Cisco	63	13	40.6	1.51	0.1
Corinne	67	2	39.6	0.74	4.0
Coyoto	66[a]	− 5[a]	30.4[a]	1.69	
Deseret	68	10	37.0	1.25	8.0
Experiment Farm	73	25	46.6		
Farmington	59	21	40.0	1.34	9.0
Fillmore	78	18	43.4	1.13	
Fort Duchesne	55	5	34.8	1.25	7.0
Frisco	67	14	39.5	0.83	1.0
Garrison	63	12	37.2	2.14	6.0
Giles	67	20	41.2	3.57	
Government Creek	62	5	37.4	1.69	1.41
Grayson	74	6	40.1	4.17	2.0
Heber	62	2	36.2	0.73	2.5
Henefer	67	−11	35.1	1.11	9.5
Hite	72	26	48.2	3.83	
Huntsville				1.39	10.0
Ibapah	62	2	31.2	1.10	11.0
Indianola				0.18	
Kanab	65	10	37.4[b]	3.20	
La Sal	58	6	37.5	1.80	
Levan	59	8	36.6	1.22	10.5
Loa	58	0	29.6	1.05	10.5
Logan	68	11	40.3	0.64	
Lucin	64	3	36.6	0.10	1.0
Manti	62	7	36.6	2.99	
Marion				1.22	9.5
Marysvale	69	4	35.2	1.78	9.6
Meadowville	55	0	33.1	0.90	8.0
Millville				0.41	
Moab	66	20	43.9	1.55	1.0
Morgan	62	− 4	35.9	1.34	10.0
Mount Nebo	58	14	38.8	0.88	3.0
Mount Pleasant	60	7	37.6	1.15	3.0
Nephi				1.23	
Oak City	65	12	39.9	1.55	
Ogden	60	11	40.8	0.92	3.5
Parowan	61	7	36.2	1.11	10.6
Payson				1.27	
Pinto	65	− 4	33.8	1.67	16.0
Plateau	62	− 3	31.8	1.97	20.9
Provo	63	15	39.5	0.89	4.0
Ranch	64	− 9	35.9	3.25	
Randolph				0.21	3.5
Rockville	76	20	49.0	2.75	
St. George	76	24	48.3	1.15	T.
Salt Air	61	18	41.3	0.89	3.5
Scipio	64	4	35.4	2.66	7.0
Snowville	68	− 5	33.4	1.80	18.0
Soldier Summit	64	− 6	31.2	1.25	13.0
Sunnyside				0.97	6.5
Thistle	68	1[c]	34.6[c]	1.15	9.0
Tooele	56	10	39.0	1.67	
Tropic	68	− 4	37.2	4.97	37.0
Trout Creek	64	13	35.9	1.25	12.0
Utah Lake	58	5	35.4	1.09	5.0
Vernal	53	3	32.4	0.97	5.0
Vermont.					
Burlington	56	16	37.5	1.38	1.5
Cavendish	56	3	33.4	1.87	2.5
Chelsea	51	0	29.0	1.80	10.0
Cornwall				2.06	3.0
Enosburg Falls	62	− 6	32.0	2.76	9.0
Manchester	62	5	34.0	4.04	1.0
Norwich	57	3	31.4	2.08	2.5
St. Johnsbury	60	3	32.3	2.10	2.3
Wells	58	4	32.2	2.11	2.0
Westfield				2.75	0.5
Woodstock	56	2	31.4	3.51	4.0
Virginia.					
Arvonia	76	12	45.0	0.39	T.
Ashland	74	16	45.7	0.47	T.
Barboursville	73	20	46.9	0.60	0.5
Bigstone Gap	67	20	45.4	1.27	T.
Blacksburg	69	11	41.0	1.18	T
Buchanan				0.66	1.0
Burkes Garden	62	11	40.6	1.25	
Callaville	76	13	48.2	1.16	
Cape Henry	74	31	51.2	0.62	
Charlottesville	73	20	47.2	0.49	T.
Clarksville				0.75	T.
Columbia	76	16	45.4	0.35	0.5
Dale Enterprise	70	15	42.0	0.77	1.0
Danville				0.34	0.2
Dinwiddie	75	8	46.4	0.73	0.8
Fredericksburg	75	15	45.0	0.36	T.
Grahams Forge	68[c]	14[c]	44.0[c]	0.58	T.
Hampton	70	26	51.0	1.20	
Hot Springs	64	11	39.1	1.06	T.
Ivanhoe				0.48	
Lexington	75	15	43.2	0.84	T.
Virginia—Cont'd.					
Lincoln	74	12	42.8	1.17	T.
Marion	68	18	44.2	0.70	
Mendota				1.37	
Newport News	74	26	50.8	0.96	1.0
Nokesville (near)	72	19	43.4	0.30	0.5
Petersburg	75	9	46.0	0.64	T.
Quantico	73	13	43.3	T.	T.
Radford				0.08	
Randolph				0.60	
Riverton				0.77	T.
Roanoke	75			0.36	T.
Rockymount	74	15	48.2	0.56	T.
Saxe	79	10	47.8	0.44	T.
Shenandoah				0.64	T.
Speers Ferry				1.90	
Spottsville	75	17	50.5	1.29	1.0
Staunton	70	18	45.1	1.08	T.
Stephens City	73	16	43.4	1.11	T.
Warsaw	74	13	46.5	0.77	0.2
Williamsburg	74	15	47.6	0.65	1.0
Woodstock	70	16	43.5	0.99	0.5
Washington.					
Aberdeen	67	26	45.8	7.06	
Anacortes	63	27	44.8	1.71	
Ashford				3.49	1.0
Bellingham	65	22	44.0	1.74	
Blaine	65	22	41.0	4.94	0.5
Brinnon	68	29	43.0	5.49	4.0
Cedonia	52	4	33.6	2.18	7.8
Centralia	67	27	44.4	3.74	T.
Cheney	59	4	38.0	0.68	9.0
Clearbrook	65	20	41.0	3.65	0.5
Clearwater	62	30	43.4	9.30	T.
Cle Elum	66	18	38.1	1.66	4.0
Colfax	66[c]	21[c]	41.5[c]	2.06	6.0
Colville	55	10	32.6	2.30	6.0
Conconully	57	5	34.0	1.26	6.0
Coupeville	63	24	45.6	0.96	T.
Crescent	54	3	34.2	1.43	6.0
Cusick	54	− 5	32.5	1.60	5.0
Danville	58	1	32.5	1.27	10.2
Dayton	68	7	41.3	2.15	7.0
Easton				3.40	3.5
East Sound	65[i]	27[i]	42.6[i]	2.84	T.
Ellensburg	64	16	36.0	0.47	2.7
Fort Simcoe				0.70	5.5
Grandmound	65	23	42.2	3.68	T.
Granite Falls				6.09	
Hatton	62	13	38.0	0.89	5.7
Horse Heaven				0.70	5.0
Ilwaco	70	31	46.8	5.96	
Kennewick	65	20	39.0	0.46	4.2
Kiona	65	18	38.4	0.37	3.0
Kosmos	74	28	43.2	3.39	
Lacenter	68	25	41.0	3.75	1.5
Lakeside	59	20	38.0	0.70	3.0
Lester	66	22	42.6	3.90	T.
Lind	59	12	37.7	1.05	9.5
Loomis	60	17	38.1	0.40	4.0
Merritt				4.01	10.0
Mottinger Ranch	66	22	41.7	0.67	3.0
Mount Pleasant	69	30	44.8	3.64	
Moxee	61	16	36.9	0.25	1.1
Northport	53	0	31.2	2.02	10.5
Odessa	62[c]	3[c]	38.1[c]	0.60	6.0
Olga	62	25	44.4	1.30	
Olympia	65	24	43.4	3.73	T.
Pinehill	59	23	40.6	1.71	11.8
Pomeroy	60	8	38.8	1.41	4.0
Port Townsend	60	27	44.8	1.07	T.
Pullman	62	8	38.7	1.37	5.1
Rattlesnake	55	15	37.6	0.71	2.5
Republic	57	− 3	31.0	1.50	9.0
Rock Lake				0.86	5.0
Rosalia	64	4	37.3	1.23	7.7
Sedro	64	25	43.4	4.91	
Snohomish	61	28	43.2	6.07	T
Snoqualmie	64	26	42.4	4.31	
Tekoa				1.80	13.0
Touchet	62	13	38.6	0.67	3.0
Twisp	61	14	36.4	0.79	7.0
Union	71	25	43.9	5.02	2.5
Vancouver	72	28	43.8	2.97	
Vashon	58	31	44.6	2.98	T
Wahluke	62[c]	21[c]	41.3[c]	0.50	5.0
Waterville	55	14	33.8	0.58	2.0
Wenatchee (near)	61	16	35.9	0.92	8.5
Wilbur	57	4	34.9	0.88	3.0
Zindel	62	21	41.4	0.81	
West Virginia.					
Bancroft	72	20	45.2	2.84	
Bayard	62	10	37.3	2.83	2.0
Beckley	68	18	44.0	1.60	
Bens Run	65[c]	19[c]	42.6[c]	3.09	T.
Berkley Springs	61	13	41.2	1.23	0.2
Buckhannon	62	16	39.8	2.48	T.
Burlington	68	12	40.9	1.10	
Cairo	65	15	42.4	5.67	T.
West Virginia—Cont'd.					
Central	65	14	40.8	3.57	T.
Charleston	70	24	47.4		
Creston	65[c]	16[c]	41.8[c]	2.99	
Cuba	67	18	42.4	3.92	T.
Doane[f]	67	19	38.5		
Durbin	60	15	38.2		T.
Elkhorn	67	20	44.8	0.67	T.
Fairmont	62	15	41.0	2.63	T.
Glenville	65	17	43.2	2.58	T.
Grafton	64	18	42.0	2.85	0.2
Green Sulphur Springs	67	12	41.6	1.83	
Harpers Ferry				0.78	
Hinton	66	22	40.4	1.62	T.
Lewisburg	62	17	41.0	1.72	T.
Logan	71	25	47.6	2.05	T.
Madison	72[d]	22[d]	44.7[d]	1.92	T.
Mannington	60	14	39.8		
Martinsburg	67	18	41.0	1.85	T.
Moorefield	74	14	42.8	1.10	T.
Morgantown	63	18	41.6	2.48	T.
Moundsville	63	18	42.2	2.69	T.
New Cumberland	60	16	39.8	2.17	T.
New Martinsville	65	21	43.6	3.29	T.
Nuttallburg	59	20	38.4	2.35	
Oceana	69	19	43.4	1.40	T.
Parsons	63	12	38.8	2.96	T.
Philippi	68	13	41.2	3.07	0.3
Pickens	61	16	42.2	2.23	T.
Powellton	70	23	45.6	1.39	T.
Princeton	61	11	37.2	1.40	0.5
Romney	68	10	42.7	1.18	T.
Rowlesburg				3.49	0.6
Ryan	69	17	42.6	2.98	0.1
Smithfield	64	14	38.9	2.81	T.
Southside	66	18	42.8	3.00	T.
Sutton	70	8	43.0	2.75	T.
Terra Alta	62	20	41.8	4.26	T.
Uppertract	68	15	42.5	1.03	2.0
Valley Fork	69	17	42.5	1.96	T.
Wellsburg	60	16	38.8	2.48	0.2
Weston				3.36	1.0
Wheeling	69	20	45.8	3.01	T.
Wisconsin.					
Amherst	60	1	33.0	2.35	12.0
Antigo	55	− 2	31.8		6.2
Appleton	61	8	35.8	1.58	4.0
Appleton Marsh	61	− 5	34.1	2.64	3.6
Ashland	67	5	34.4	1.80	
Barron	62	−10	32.1	2.70	13.0
Beloit	59	9	37.4	1.98	T.
Berlin	59	5	35.8	1.08	T.
Black River Falls				1.70	2.0
Burnett	58	7	34.8	2.25	2.7
Chilton	60	8	34.8	1.28	1.7
Citypoint	65[c]	12[d]	37.2[c]	1.64	
Downing	60	−20	33.3	1.06	9.0
Eau Claire	60	− 8	34.8	1.33	3.4
Fond du Lac	59	7	34.2	2.00	2.0
Grand Rapids	59	0	35.6	1.92	1.0
Grand River Locks				2.79	2.0
Grantsburg	57	−24	32.1	2.48	16.0
Hancock	59	1	34.0	1.76	T.
Harvey	58	5	35.0	3.06	5.8
Hayward	58	3	31.8	2.82	12.7
Hillsboro	61	− 1	34.6	2.86	3.0
Koepenick	63	−12	31.0	2.10	14.0
Lancaster	60	1	37.2	2.68	
Manitowoc	58	11	36.1	2.14	0.5
Mauston	60	5	36.8	1.92	2.0
Meadow Valley	63	− 4	33.6	1.96	2.5
Medford	59	− 6	32.4	0.65	4.0
Menasha				0.91	0.5
Merrill	61	− 3	31.8	1.54	5.0
Minocqua	51	6	28.7	1.45	11.0
Mount Horeb	60	− 1	35.8	3.25	2.0
Neillsville	60	− 5	33.9	1.77	6.0
New London	62	5	34.5	1.98	3.0
New Richmond	59	−15	34.3	2.52	11.0
Oconto	61	8	34.0	1.85	4.5
Osceola	59	−21	33.0	1.80	11.0
Oshkosh	58[d]	6	34.8	1.46	5.0
Pine River	63	2	34.4	2.07	2.8
Portage	61	3	35.9	2.17	2.0
Port Washington	60	12	36.2	2.08	2.5
Prairie du Chien	65	5	38.6	2.80	T.
Prentice	65	−10	33.3	1.57	6.7
Racine	64	14	38.0	2.02	
Sheboygan	60	11	37.4	2.12	1.0
Spooner	57	−20	31.7	2.07	15.0
Stanley	58	−10	34.0	2.62	6.4
Stevens Point	59	0	34.2	1.79	4.0
Sturgeon Bay Canal	60	13	35.2	2.07	T.
Tomahawk				1.90	9.0
Valley Junction	61	− 3	35.1	1.86	2.5
Viroqua	60	− 1	35.6	3.21	3.5
Watertown	60	6	35.6	2.26	1.0
Waukesha				2.19	5.2
Waupaca	59	2	33.4	2.03	5.2

TABLE II.—*Climatological record of cooperative observers*—Continued. *Late reports for October.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Wisconsin—Cont'd.	°	°	°	*Ins.*	*Ins.*
Wausau	57	1	33.4	1.33	1.5
Whitehall	62	−5	34.8	1.58	3.0
Wyoming.					
Afton	64	0	33.0	0.44	7.5
Barnum	....	....	....	0.70	7.0
Bedford	62	−5	32.6	0.96	9.6
Border	57	−4	30.8	0.38	....
Buffalo	69	−14	34.8	0.05	0.5
Cambria	67	−7	37.6	0.60	6.0
Chugwater	70	−3	36.4	0.30	1.0
Clark	....	....	....	0.25	2.5
Cody	59	−15	35.4	0.20	2.0
Daniel	60	−22	27.5	0.33	3.3
Elk Mountain	....	....	....	1.40	12.5
Evanston	65	−7	32.6	0.15	1.0
Experiment Farm	....	....	....	0.01	T.
Fort Laramie	70	2	37.6	0.24	....
Fort Washakie	65	−20	31.6	2.54	17.0
Gillette	66	−8	38.2	0.70	6.0
Granite Canyon	60	5	35.2	0.10	1.0
Granite Springs	....	....	....	0.28	2.8
Green River	58	−4	32.5	0.20	2.0
Griggs	73	−26	36.3	0.43	4.3
Hatton	....	....	....	0.60	5.5
Hyattville	67	−14	37.0	0.50	5.0
Kirtley	67	−10	35.8	0.50	2.5
Laramie	61	5	33.0	0.22	2.5
Leo	58	−16	33.6	0.92	11.2
Little Medicine	59	−16	28.8	0.98	13.0
Lolabama Ranch	61	−11	30.9	0.58	5.0
Lusk	69	−12	32.6	0.35	3.5
Moore	65	4	38.6	0.53	4.6
Moorcroft	68	−9	34.4	0.40	4.0
Phillips	73	−6	38.8	T.	T.
Pine Bluff	74	1	39.0	T.	T.
Rambler	50	−1	26.8	0.92	29.0
Sheridan	72	−18	35.4	0.45	3.5
South Pass City	64	−9	26.3	0.80	8.0
Story	68	0	37.4	0.55	5.5
Thayne	62	3	32.0	0.70	6.7
Wilson	57	−7	29.3	0.30	4.5
Wolf	73	−11	40.2	0.35	3.5
Yellowstone Pk. (Foun'n)	59	−11	27.0	0.64	9.0
Yellowstone Pk. (Lake)	48	−9	26.2	1.40	15.0
Yellowstone Pk. (Norris)	60	−25	25.4	0.89	....
Yellowstone Pk (Riversde)	55	−20	26.2	....	....
Yellowstone Pk (Snake R)	61	−5	29.4	....	....
Yellowstone Pk. (Soda B.)	55	−21	26.4	0.83	8.3
Yellowstone Pk. (Thumb)	48	−10	26.9	0.63	....
Yellowstone Pk. (Up. B.)	56	−10	26.5	....	....
Porto Rico.					
Adjuntas	89	53	72.1	4.31	
Agua Buenos	....	....	....	9.50	
Aguirre	98	69	81.1	5.12	
Aribonita*	84	58	71.9	....	
Arecibo	91	59	75.8	10.00	
Barros	84	59	72.2	4.22	
Bayamon	92	62	77.4	6.45	
Caguas	89	61	75.8	4.37	
Canovanas	88	70	79.0	6.55	
Cayey	87^{d}	68^{d}	78.6^{d}	....	
Cidra	89	57	73.8	6.44	
Coloso	91	66	79.0	12.94	
Corozal	91	60	79.0	3.75	
Fajardo	92	68	80.8	9.26	
Guanica	92	64	78.2	6.38	
Hacienda Josefa	....	....	....	4.64	
Humacao	89	73	82.7	12.39	
Porto Rico—Cont'd.	°	°	°	*Ins.*	*Ins.*
Ingenio	....	....	....	10.69	
Isabela	92	69	79.4	3.87	
Juana Diaz	94	66	81.2	3.79	
La Carmelita	87	63	74.8	13.52	
Lares	91	59	75.4	14.66	
Las Cruces	87	63	72.8	8.45	
Las Marias	89	64	76.6	12.32	
Manati	95	65	78.6	6.04	
Maunabo	92	68	80.8	9.52	
Mayaguez	92	65	78.4	8.52	
Morovis	95	59	77.3	7.47	
Ponce	90	68	79.1	2.90	
Rio Blanco	90	66	77.8	13.01	
Rio Piedras	....	....	....	5.57	
San German	90	68	79.0	5.24	
San Lorenzo	91	64	77.0	13.34	
San Salvador	86	61	73.8	7.57	
Santa Isabel	92^{e}	66^{e}	78.5^{e}	3.73	
Vega Baja	93	67	80.0	6.07	
Vieques	97	71	80.5	5.45	
New Brunswick.					
St. John	51	9	35.2	3.66	4.1
West Indies.					
Basseterre, St. Kitts	88	70	80.4	3.30	
Port of Spain	90	67	78.0	10.26	
Roseau	90	71	81.0	4.27	

Late reports for October, 1905.

Stations.	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Alaska.	°	°	°	*Ins.*	*Ins.*
Chestochena	46	−2	25.6	1.68	13.6
Coal Harbor	58	30	43.2	3.03	
Copper Center	49	−3	27.6	0.97	13.2
Fairbanks	53	−8	23.3	....	....
Fort Egbert	63	47	29.6	2.96	30.0
Kenai	54	12	38.0	2.92	T.
Ketchemstock	43	−18	16.9	1.18	11.8
Orca	64	31	42.5	15.57	....
Sunrise	53	21	37.2	4.36	1.4
Tanana	67	−3	29.4	1.40	9.0
Tyoonok	58	22	37.1	3.19	2.2
Teikhill	52	9	31.2	1.48	10.0
Udakta	56	28	41.5	5.00	
Wood Island	52^{e}	31^{e}	41.8^{e}	7.50	
Arizona.					
Fort Apache	85	20	54.0	T.	
Fort Huachuca	85	27	58.0	0.21	
Parker	107	40	70.8	0.00	
California.					
Bowman	....	....	....	0.47	
Glendora	....	....	....	0.15	
Jolon	....	....	....	0.00	
Kernville	....	....	....	0.00	
Laytonville	....	....	....	0.59	
Snedden Ranch	....	....	....	0.00	
Welden	....	....	....	0.60	
Westpoint	....	....	....	0.00	
Willow	92	48	68.4	0.00	
Colorado.					T.
San Luis	76	5	45.4	T.	
Delaware.					
Delaware City	....	....	....	3.49	
Illinois.					
Albion	82	28	57.8	6.06	
Hillsboro	88	28	56.0	9.72	
Iowa.	°	°	°	*Ins.*	*Ins.*
Wapello	82	26	52.9	2.04	
Kentucky.					
Alpha	82	30	58.2	8.00	
Franklin	85	32	59.8	2.30	
Louisiana.					
Caspiana	94	37	67.4	3.90	
Montana.					
Hamilton	77	11	40.6	0.33	1.0
St. Pauls	88	−2	42.4	1.09	14.0
New Jersey.					
River Vale	82	25	51.8	1.48	
New Mexico.					
Maxwell City	....	....	....	0.05	
North Carolina.					
Moncure	89	29	60.1	1.33	
Saxon	83	26	59.0	2.15	
South Carolina.					
Statesburg	87	37	65.3	2.52	
Sumter	93^{e}	33^{e}	67.6^{e}	1.37	
South Dakota.					
Leola	....	....	....	0.70	11.0
Texas.					
Jewett	95	34^{h}	66.2^{d}	4.35	
Washington.					
Ephrata	66	25	45.0	1.90	
West Virginia.					
Wellsburg	77	32	52.4	3.99	
Wisconsin.					
Butternut	80	6	41.1	3.45	T.

EXPLANATION OF SIGNS.

* Extremes of temperature from observed readings of dry thermometer.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:

[1] Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. ÷ 4.
[2] Mean of 8 a. m. + 8 p. m. ÷ 2.
[3] Mean of 7 a. m. + 7 p. m. ÷ 2.
[4] Mean of 6 a. m. + 6 p. m. ÷ 2.
[5] Mean of 7 a. m. + 2 p. m. ÷ 2.
[6] Mean of readings at various hours reduced to true daily mean by special tables.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An italic letter following the name of a station, as "Livingston *a*," "Livingston *b*," indicates that two or more observers, as the case may be, are reporting from the same station. A small roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance, "n" denotes 14 days missing.

No note is made of breaks in the continuity of temperature records when the same do not exceed two days. All known breaks of whatever duration, in the precipitation record receive appropriate notice.

CORRECTIONS.

June to October, 1905, inclusive, Arkansas, Jonesboro, cut out all maximum and mean temperature values.

October, 1905, Colorado, Gunnison, cut out minimum and mean temperatures. Texas, Decatur, cut out all temperature values. North Carolina, Goldsboro, make mean temperature 61.0 instead of 61.2.

TABLE III.—*Resultant winds from observations at 8 a. m. and 8 p. m., daily, during the month of November, 1905.*

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
New England.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Eastport, Me	21	15	9	33	n. 76 w.	25
Portland, Me	17	16	6	33	n. 88 w.	27
Concord, N. H. †	11	6	7	13	n. 50 w.	8
Northfield, Vt	18	27	5	23	s. 63 w.	20
Boston, Mass	18	13	3	39	n. 82 w.	36
Nantucket, Mass	24	14	7	33	n. 69 w.	28
Block Island, R. I	22	15	6	31	n. 74 w.	26
Providence, R. I	21	9	6	38	n. 69 w.	34
Hartford, Conn	22	21	6	25	n. 87 w.	19
New Haven, Conn	28	10	7	28	n. 49 w.	28
Middle Atlantic States.						
Albany, N. Y	23	25	6	19	s. 81 w.	13
Binghamton, N. Y. †	7	6	7	15	n. 83 w.	8
New York, N. Y	23	11	5	33	n. 67 w.	31
Harrisburg, Pa	15	17	10	32	s. 85 w.	22
Philadelphia, Pa	23	18	5	31	n. 79 w.	26
Scranton, Pa	19	22	10	27	s. 30 w.	17
Atlantic City, N. J	23	12	5	35	n. 70 w.	32
Cape May, N. J	25	14	5	26	n. 62 w.	24
Baltimore, Md	26	15	4	30	n. 67 w.	28
Washington, D. C	26	17	7	26	n. 65 w.	21
Lynchburg, Va	19	19	15	23	w.	8
Mount Weather, Va	25	14	12	27	n. 54 w.	19
Norfolk, Va	23	22	18	12	n. 82 e.	7
Richmond, Va	23	24	8	15	s. 82 w.	7
Wytheville, Va	14	7	14	36	n. 72 w.	23
South Atlantic States.						
Asheville, N. C	25	16	18	15	n. 18 e.	10
Charlotte, N. C	18	18	21	20	e.	1
Hatteras, N. C	28	8	19	19	n.	20
Raleigh, N. C	27	15	7	22	n. 51 w.	19
Wilmington, N. C	26	14	12	21	n. 37 w.	15
Charleston, S. C	24	15	12	15	n. 18 w.	10
Columbia, S. C	21	16	17	20	n. 31 w.	6
Augusta, Ga	24	17	15	18	n. 23 w.	7
Savannah, Ga	22	14	15	22	n. 41 w.	11
Jacksonville, Fla	32	9	15	17	n. 5 w.	23
Florida Peninsula.						
Jupiter, Fla	29	7	23	15	n. 20 e.	23
Key West, Fla	37	3	35	2	n. 44 e.	47
Tampa, Fla	36	2	25	15	n. 16 e.	35
Eastern Gulf States.						
Atlanta, Ga	23	13	16	22	n. 31 w.	12
Macon, Ga. †	16	8	5	9	n. 27 w.	9
Pensacola, Fla. †	14	4	12	6	n. 31 e.	12
Birmingham, Ala. †	11	7	10	9	n. 14 e.	4
Mobile, Ala	25	18	17	11	n. 41 e.	9
Montgomery, Ala	21	18	17	17	n.	3
Meridian, Miss. †	9	8	7	9	n. 63 w.	2
Vicksburg, Miss	20	19	23	10	n. 86 e.	13
New Orleans, La	28	17	19	7	n. 47 e.	16
Western Gulf States.						
Shreveport, La	18	23	16	16	s.	5
Fort Smith, Ark	15	10	25	19	n. 50 e.	8
Little Rock, Ark	23	16	17	20	n. 23 w.	7
Corpus Christi, Tex	24	22	21	5	n. 83 e.	16
Fort Worth, Tex	19	23	9	21	s. 72 w.	13
Galveston, Tex	25	22	15	8	n. 67 e.	7
Palestine, Tex	19	23	15	21	s. 56 w.	7
San Antonio, Tex	28	17	17	9	n. 36 e.	14
Taylor, Tex. †	14	10	3	9	n. 56 w.	7
Ohio Valley and Tennessee.						
Chattanooga, Tenn	17	22	11	24	s. 69 w.	14
Knoxville, Tenn	23	18	13	21	n. 58 w.	9
Memphis, Tenn	19	23	17	15	s. 27 e.	4
Nashville, Tenn	20	19	14	20	n. 80 w.	6
Lexington, Ky. †	7	12	7	10	s. 31 w.	6
Louisville, Ky	16	22	11	23	s. 63 w.	13
Evansville, Ind. †	14	9	5	12	n. 54 w.	9
Indianapolis, Ind	17	24	12	22	s. 55 w.	12
Cincinnati, Ohio	14	18	18	24	s. 56 w.	7
Columbus, Ohio	14	26	12	23	s. 43 w.	16
Pittsburg, Pa	18	17	9	31	n. 87 w.	22
Parkersburg, W. Va	20	19	8	24	n. 87 w.	16
Elkins, W. Va	21	13	6	32	n. 73 w.	27
Lower Lake Region.						
Buffalo, N. Y	10	18	9	36	s. 73 w.	28
Oswego, N. Y	18	25	9	23	s. 63 w.	16
Rochester, N. Y	10	21	7	35	s. 68 w.	30
Syracuse, N. Y	8	31	5	27	s. 44 w.	32
Erie, Pa	11	26	8	27	s. 52 w.	24
Cleveland, Ohio	12	30	15	20	s. 16 w.	19
Sandusky, Ohio †	5	11	4	18	s. 67 w.	15
Toledo, Ohio	10	24	7	28	s. 56 w.	25
Detroit, Mich	15	19	6	33	s. 82 w.	27
Upper Lake Region.						
Alpena, Mich	11	21	6	35	s. 71 w.	31
Escanaba, Mich	19	15	5	36	n. 83 w.	31
Grand Rapids, Mich	15	21	13	23	s. 59 w.	12
Houghton, Mich. †	10	4	8	13	n. 40 w.	8
Marquette, Mich	10	18	6	34	s. 74 w.	29
Port Huron, Mich	11	19	7	25	s. 74 w.	29
Sault Ste. Marie, Mich						
Chicago, Ill	13	20	11	31	s. 71 w.	21
Milwaukee, Wis	14	14	9	32	w.	23
Green Bay, Wis	11	23	8	32	s. 63 w.	27
Duluth, Minn	22	9	12	32	n. 57 w.	24
North Dakota.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Moorhead, Minn	22	22	10	21	w.	11
Bismarck, N. Dak	25	9	15	24	n. 29 w.	18
Devils Lake, N. Dak	15	19	13	28	s. 75 w.	16
Williston, N. Dak	17	21	9	23	s. 74 w.	15
Upper Mississippi Valley.						
Minneapolis, Minn. *	6	11	4	15	s. 66 w.	12
St. Paul, Minn	22	15	15	22	n. 45 w.	10
La Crosse, Wis. †	9	13	2	9	s. 60 w.	8
Madison, Wis	15	21	10	25	s. 68 w.	16
Charles City, Iowa	17	17	16	26	w.	10
Davenport, Iowa	19	13	11	29	n. 72 w.	19
Des Moines, Iowa	15	18	14	27	s. 77 w.	13
Dubuque, Iowa	21	14	7	27	n. 71 w.	21
Keokuk, Iowa	17	20	13	24	s. 72 w.	10
Cairo, Ill	19	21	17	18	s. 27 w.	2
La Salle, Ill. †	6	6	8	16	w.	8
Peoria, Ill	7	12	6	10	s. 39 w.	6
Springfield, Ill	16	23	15	24	s. 52 w.	11
Hannibal, Mo. †	6	12	4	14	s. 59 w.	12
St. Louis, Mo	16	16	20	21	w.	1
Missouri Valley.						
Columbia, Mo. *	6	12	9	11	s. 18 w.	6
Kansas City, Mo	18	24	16	16	s.	6
Springfield, Mo	16	23	18	19	s. 8 w.	7
Topeka, Kans. *	8	13	8	8	s.	5
Lincoln, Nebr	16	27	12	19	s. 32 w.	13
Omaha, Nebr	19	22	10	22	s. 76 w.	12
Valentine, Nebr	23	13	9	30	n. 65 w.	23
Sioux City, Iowa †	10	11	8	11	s. 72 w.	3
Pierre, S. Dak	18	20	19	20	s. 27 w.	2
Huron, S. Dak	18	19	14	20	s. 80 w.	6
Yankton, S. Dak. †	7	8	5	17	s. 85 w.	12
Northern Slope.						
Havre, Mont	12	12	8	38	w.	30
Miles City, Mont	15	21	11	25	s. 67 w.	15
Helena, Mont	10	19	1	44	s. 78 w.	44
Kalispell, Mont	21	15	1	35	n. 80 w.	34
Rapid City, S. Dak	17	9	8	37	n. 75 w.	30
Cheyenne, Wyo	23	13	4	33	n. 71 w.	31
Lander, Wyo	18	27	16	17	s. 6 w.	9
Yellowstone Park, Wyo	10	34	3	25	s. 42 w.	32
North Platte, Nebr	14	19	17	24	s. 54 w.	9
Middle Slope.						
Denver, Colo	21	24	8	16	s. 69 w.	8
Pueblo, Colo	23	9	15	25	n. 36 w.	17
Concordia, Kans	12	30	12	18	s. 18 w.	19
Dodge, Kans	16	21	14	23	s. 61 w.	10
Wichita, Kans	19	25	13	17	s. 34 w.	7
Oklahoma, Okla	18	23	13	17	s. 39 w.	6
Southern Slope.						
Abilene, Tex	18	27	10	19	s. 45 w.	13
Amarillo, Tex	17	23	12	21	s. 56 w.	11
Roswell, N. Mex	17	26	9	17	s. 42 w.	12
Southern Plateau.						
El Paso, Tex	25	4	24	24	n.	21
Santa Fe, N. Mex	26	17	27	11	n. 61 w.	18
Flagstaff, Ariz	21	12	20	16	n. 24 e.	10
Phoenix, Ariz	14	13	29	15	n. 86 e.	14
Yuma, Ariz	28	10	23	14	n. 27 e.	20
Independence, Cal						
Middle Plateau.						
Carson City, Nev						
Winnemucca, Nev	27	15	28	14	n. 49 e.	18
Modena, Utah	6	14	16	32	s. 63 w.	18
Salt Lake City, Utah	15	25	22	18	s. 22 e.	11
Durango, Colo	16	17	6	32	s. 88 w.	26
Grand Junction, Colo	33	7	15	20	n. 11 w.	26
Northern Plateau.						
Baker City, Oreg						
Boise, Idaho	18	14	24	17	n. 60 e.	8
Lewiston, Idaho †	3	12	16	8	s. 42 e.	12
Pocatello, Idaho	3	31	25	17	s. 16 e.	29
Spokane, Wash	23	15	27	16	n. 54 e.	14
Walla Walla, Wash	4	41	11	15	s. 6 w.	37
North Pacific Coast Region.						
North Head, Wash						
Port Crescent, Wash. *	0	14	14	6	s. 30 e.	16
Seattle, Wash	15	24	25	7	s. 63 e.	20
Tacoma, Wash	13	31	13	16	s. 9 w.	18
Tatoosh Island, Wash	12	13	29	11	s. 87 e.	18
Portland, Oreg	15	21	21	23	s. 18 w.	6
Roseburg, Oreg	20	20	24	13	e.	11
Middle Pacific Coast Region.						
Eureka, Cal	16	20	22	13	s. 66 e.	10
Mount Tamalpais, Cal	31	11	10	24	n. 35 w.	24
Red Bluff, Cal	37	15	5	8	n. 8 w.	22
Sacramento, Cal	23	23	17	8	e.	9
San Francisco, Cal	19	11	9	31	n. 70 w.	23
South Pacific Coast Region.						
Fresno, Cal	27	12	15	22	n. 25 w.	17
Los Angeles, Cal	22	8	21	20	n. 4 e.	14
San Diego, Cal	27	9	19	22	n. 9 w.	18
San Luis Obispo, Cal	35	7	9	21	n. 23 w.	30
West Indies.						
Grand Turk, W. I	6	7	21	1	s. 87 e.	20
San Juan, Porto Rico	2	38	32	5	s. 37 e.	45
Hamilton, Bermuda	23	16	12	21	n. 52 w.	11

* From observations at 8 p. m. only. † From observations at 8 a. m. only.

TABLE IV.—*Accumulated amounts of precipitation for each 5 minutes, for storms in which the rate of fall equaled or exceeded 0.25 in any 5 minutes, or 0.75 in 1 hour during November, 1905, at all stations furnished with self-registering gages.*

Stations.	Date.	Total duration.		Total amount of precipitation.	Excessive rate.		Amount before excessive began.	Depths of precipitation (in inches) during periods of time indicated.													
		From—	To—		Began—	Ended—		5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Albany, N. Y	28-29			0.47														0.20			
Alpena, Mich	28-29			0.69														*			
Amarillo, Tex	8-9			3.23														0.45			
Asheville, N. C	19			0.20														0.05			
Atlanta, Ga	9-10			1.48														0.23			
Atlantic City, N. J	28-29			0.93														0.30			
Augusta, Ga	9-10			1.44														0.27			
Baltimore, Md	28-29			1.26														0.22			
Binghamton, N. Y	28-29			0.95														0.12			
Birmingham, Ala	29	11:34 a. m.	12:25 p. m.	0.68	11:42 a. m.	12:04 p. m.	0.01	0.12	0.14	0.42	0.64										
Bismarck, N. Dak	27-28			0.72														*			
Block Island, R. I	3-4	11:50 p. m.	4:20 a. m.	1.19	2:00 a. m.	2:38 a. m.	0.20	0.06	0.10	0.15	0.21	0.27	0.43	0.68	0.76						
Boise, Idaho	27			0.56														*			
Boston, Mass	28-29			1.08														0.23			
Buffalo, N. Y	28-29			0.88														*			
Cairo, Ill	28	1:11 p. m.	8:00 p. m.	2.15	3:57 p. m.	4:42 p. m.	0.74	0.08	0.15	0.27	0.32	0.35	0.42	0.49	0.54	0.65					
Charles City, Iowa	23-24			0.70														0.23			
Charleston, S. C	10-11			0.89														0.20			
Charlotte, N. C	19-20			0.55														0.17			
Chattanooga, Tenn	19			0.43														0.24			
Cheyenne, Wyo	27			0.10														*			
Chicago, Ill	27-28			0.91														0.28			
Cincinnati, Ohio	24			0.40														0.30			
Cleveland, Ohio	28-29			1.20														0.42			
Columbia, Mo	4-5			0.78														0.20			
Columbia, S. C	9-10			1.15														0.20			
Columbus, Ohio	5			0.73														0.24			
Concord, N. H	3-4			0.78														0.20			
Corpus Christi, Tex	19	8:49 a. m.	5:21 p. m.	1.98	9:32 a. m.	10:22 a. m.	0.05	0.10	0.22	0.32	0.38	0.48	0.64	0.81	0.98	1.11	1.17				
Davenport, Iowa	5			0.95														0.21			
Denver, Colo	5			0.02																	
Des Moines, Iowa	23			0.65														0.28			
Detroit, Mich	28			1.32														0.43			
Dodge, Kans	4-5			1.11														*			
Dubuque, Iowa	27-28			1.08														0.23			
Duluth, Minn	23-24			1.02														*			
Eastport, Me	15-16			1.23														0.27			
Elkins, W. Va	28-29			0.78														0.22			
Erie, Pa	28-29			0.90														*			
Escanaba, Mich	27-28			1.61														*			
Evansville, Ind	18-19			2.18														0.65			
Fort Smith, Ark	4-5			1.50														0.24			
Fort Worth, Tex	8-9			2.34														0.45			
Galveston, Tex	9	7:10 a. m.	3:30 p. m.	1.54	10:00 a. m.	10:37 a. m.	0.42	0.18	0.32	0.40	0.44	0.46	0.59	0.71	0.75						
Do	24	D. N.	D. N.	0.70	3:21 a. m.	3:36 a. m.	0.15	0.09	0.39	0.47											
Grand Rapids, Mich	27-28			0.91														0.41			
Green Bay, Wis	5-6			0.64														*			
Hannibal, Mo	27			0.41														0.26			
Harrisburg, Pa	28-29			1.28														0.20			
Hartford, Conn	28-29			0.95														0.22			
Hatteras, N. C	15			0.32									0.30								
Huron, S. Dak	27			0.60														*			
Indianapolis, Ind	5			1.00														0.32			
Iola, Kans	23			0.93														0.44			
Jacksonville, Fla	10			0.52														0.14			
Jupiter, Fla	21-22			2.06														0.47			
Kansas City, Mo	23			0.82														0.37			
Key West, Fla	18			0.13														0.12			
Knoxville, Tenn	29			0.46														0.44			
La Crosse, Wis	5			1.29														0.25			
La Salle, Ill	5			0.87														0.20			
Lexington, Ky	28-29			2.44														*			
Lincoln, Nebr	23			0.84														0.31			
Little Rock, Ark	28	12:40 p. m.	6:40 p. m.	2.94	3:56 p. m.	5:05 p. m.	0.31	0.15	0.33	0.56	0.91	1.12	1.22	1.52	1.85	1.97	2.04	2.29	2.55		
Los Angeles, Cal	26-27			1.38														0.49			
Louisville, Ky	28-29	1:19 p. m.	5:30 a. m.	2.76	7:15 p. m.	8:00 p. m.	1.07	0.10	0.27	0.39	0.50	0.60	0.74	0.86	0.94	0.99					
Lynchburg, Va	20			0.11														0.07			
Macon, Ga	9-10			1.51														*			
Madison, Wis	27-28			0.81														0.27			
Memphis, Tenn	28			0.97														0.67			
Meridian, Miss	29			0.39									0.30								
Milwaukee, Wis	27-28			0.36														0.13			
Minneapolis, Minn	23-24			1.00														0.21			
Montgomery, Ala	9-10			1.23														0.22			
Mount Weather, Va	28-29			0.47														*			
Nantucket, Mass	15-16			0.91														0.42			
Nashville, Tenn	29	2:30 a. m.	7:45 a. m.	1.03	3:41 a. m.	4:05 a. m.	0.19	0.11	0.14	1.16	0.31	0.51									
New Haven, Conn	28-29			0.98														0.11			
New Orleans, La	9	10:30 a. m.	8:30 p. m.	2.56	2:58 p. m.	3:40 p. m.	0.47	0.14	0.36	0.55	0.74	0.95	1.00	1.04	1.11						
New York, N. Y	28-29			1.50														0.18			
Norfolk, Va	20			0.56														0.09			
Northfield, Vt	6-7			0.90														*			
North Head, Wash																					
Oklahoma, Okla	23			0.33														0.14			
Omaha, Nebr	23			0.71														0.31			
Palestine, Tex	8-9	7:18 p. m.	8:15 a. m.	1.82	4:57 a. m.	5:23 a. m.	0.50	0.25	0.52	0.58	0.69	0.80									
Parkersburg, W. Va	28-29			2.01														0.37			
Pensacola, Fla	21			0.47														0.24			
Peoria, Ill	5			1.14														0.39			
Philadelphia, Pa	28-29			1.34														0.19			
Pittsburg, Pa	28-29			1.19														0.23			
Portland, Me	7-8			1.23														0.27			
Portland, Oreg	18-19			1.13														0.21			
Pueblo, Colo	22			0.20														0.15			
Raleigh, N. C	19-20			0.62														0.19			
Richmond, Va	19-20			0.31														0.08			
Rochester, N. Y	29			0.17														0.09			
Sacramento, Cal	29			0.92														0.25			
St. Louis, Mo	4-5			1.09														0.27			
St. Paul, Minn	27-29			1.15														*			

TABLE IV —*Accumulated amounts of precipitation for each 5 minutes, etc.*—Continued.

Stations.	Date.	Total duration. From—	Total duration. To—	Total amount of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Salt Lake City, Utah	27			0.40														*			
San Antonio, Tex	8-9	6:30 p.m.	6:30 a.m.	1.00	4:01 a.m.	4:44 a.m.	0.15	0.08	0.31	0.42	0.47	0.58	0.65	0.70	0.78	0.83					
San Diego, Cal.	5			1.69														0.47			
Sandusky, Ohio	28-29			1.10														*			
San Francisco, Cal	26-27			0.38														0.15			
Savannah, Ga	10			1.07														0.23			
Scranton, Pa	28-29			1.40														0.21			
Seattle, Wash	18-19			1.66														0.29			
Shreveport, La	5			0.93														0.25			
Spokane, Wash	26-27			0.36														*			
Springfield, Ill	4-5			0.85														0.37			
Springfield, Mo	4-5			0.73														0.19			
Syracuse, N. Y	6			0.40														*			
Tampa, Fla	10			0.26														0.20			
Taylor, Tex.	9	D. N.	D. N.	1.58	3:30 a.m.	4:05 a.m.	0.36	0.08	0.26	0.31	0.39	0.47	0.75	0.97							
Do	23	D. N.	D. N.	0.82	9:55 p.m.	10:15 p.m.	T.	0.15	0.37	0.46	0.60										
Toledo, Ohio	28-29	9:45 p.m.	12:30 a.m.	1.01	9:59 p.m.	10:34 p.m.	0.01	0.05	0.12	0.28	0.40	0.50	0.55	0.63							
Topeka, Kans	23			0.82														0.50			
Valentine, Nebr	27			0.68														*			
Vicksburg, Miss	5-6			0.58														0.46			
Washington, D. C	28-29			0.73														0.17			
Wichita, Kans	4			1.87														0.35			
Williston, N. Dak.	26-29			0.26														*			
Wilmington, N. C	10-11			0.65														0.10			
Wytheville, Va.	19-20			0.27														0.10			
Yankton, S. Dak	4-5			0.88														0.12			
Cienfuegos, Cuba																					
San Juan, Porto Rico	27-28	7:36 p.m.	D. N.	1.85	9:07 p.m.	10:28 p.m.	0.15	0.12	0.21	0.35	0.49	0.60	0.68	0.77	0.83	0.85	0.91	1.05	1.49		
Santiago de Cuba																					
Santo Domingo, S. D.																					

* Self-register not working   † No precipitation.

TABLE V.—*Data furnished by the Canadian Meteorological Service, November, 1905.*

Stations.	Pressure, in inches. Actual, reduced to mean of 24 hours.	Pressure. Sea level, reduced to mean of 24 hours.	Pressure. Departure from normal.	Temperature. Mean.	Temperature. Departure from normal.	Temperature. Mean maximum.	Temperature. Mean minimum.	Precipitation. Total.	Precipitation. Departure from normal.	Precipitation. Total snowfall.
	Ins.	Ins.	Ins.	°	°	°	°	Ins.	Ins.	Ins.
St. Johns, N. F	29.62	29.76	—.18	37.8	+ 1.3	44.3	31.3	6.52	+0.95	1.5
Sydney, C. B. I	29.81	29.85	—.10	38.2	+ 1.1	45.4	31.1	5.01	—0.43	0.5
Halifax, N. S	29.79	29.90	—.11	37.2	— 0.1	44.8	29.6	6.35	+0.69	4.3
Grand Manan, N. B	29.83	29.88	—.13	38.4	— 0.5	45.3	31.6	5.87	+0.25	1.3
Yarmouth, N. S	29.85	29.92	—.10	38.8	— 1.1	44.9	32.7	6.09	+1.53	0.4
Charlottetown, P. E. I	29.82	29.86	—.10	35.7	+ 0.2	41.8	29.6	6.12	+2.15	4.0
Chatham, N. B	29.82	29.84	—.13	33.4	+ 2.4	41.2	25.6	3.71	—0.04	10.4
Father Point, Que	29.83	29.85	—.11	30.5	+ 1.6	35.9	25.0	1.96	—1.15	8.9
Quebec, Que	29.58	29.92	—.10	28.7	— 0.3	35.0	22.3	2.86	—0.90	13.6
Montreal, Que	29.73	29.95	—.08	32.2	+ 0.4	38.5	25.9	3.45	—0.29	13.4
Rockliffe, Ont.	29.32	29.95	—.06	28.3	— 0.8	35.9	20.7	1.72	—0.86	16.5
Ottawa, Ont	29.60	29.94	—.08	31.6	— 0.1	37.9	25.3	1.74	—0.80	14.0
Kingston, Ont.	29.68	30.00	—.04	35.3	+ 0.3	42.5	28.1	2.96	—0.28	4.2
Toronto, Ont	29.60	29.99	—.06	36.9	+ 1.3	43.6	30.1	1.78	—1.36	2.8
White River, Ont	28.57	29.93	—.05	22.9	+ 2.4	29.5	16.2	3.53	+1.68	22.1
Port Stanley, Ont	29.37	30.03	—.02	36.1	— 0.7	43.8	28.3	2.97	—0.40	2.8
Saugeen, Ont	29.26	29.99	—.03	35.2	+ 0.2	41.7	28.7	3.74	+0.04	8.1
Parry Sound, Ont	29.26	29.97	—.04	31.7	— 0.4	39.3	24.2	4.81	+0.44	11.0
Port Arthur, Ont	29.24	29.97	—.03	26.9	+ 2.9	34.3	19.4	2.70	+1.37	4.1
Winnipeg, Man	29.13	29.99	—.05	26.7	+ 8.7	35.1	18.2	1.13	+0.05	11.1
Minnedosa, Man	28.11	29.98	—.06	28.4	+11.1	37.5	19.3	0.85	—0.65	2.3
Qu'Appelle, Assin	27.64	29.93	—.07	29.7	+10.9	37.3	22.1	1.00	+0.11	7.8
Medicine Hat, Assin	27.64	29.95	—.05	37.3	+ 9.9	48.5	26.1	0.30	—0.62	3.0
Swift Current, Assin	27.35	29.96	—.06	32.6	+ 9.4	41.7	23.5	0.36	—0.33	2.2
Calgary, Alberta	26.36	29.96	—.02	33.7	+ 7.9	44.6	22.8	1.20	+0.32	11.4
Banff, Alberta	25.34	30.03	+.07	30.2	+ 4.4	37.5	22.9	0.54	—1.73	4.7
Edmonton, Alberta	27.50	29.92	—.05	33.4	+10.5	42.2	24.5	0.83	+0.25	5.5
Prince Albert, Sask	28.30	29.90	—.13	27.0	+11.6	35.0	18.9	1.40	+0.57	6.0
Battleford, Sask	28.19	29.97	—.05	29.8	+13.5	38.7	20.8	0.04	—0.54	0.2
Kamloops, B. C.	28.80	30.05	+.09	35.4	+ 2.0	40.9	30.0	0.31	—1.15	2.5
Victoria, B. C.	29.95	30.05	+.06	44.8	+ 1.6	49.0	40.6	0.91	—6.05	T.
Barkerville, B. C.				26.0	+ 2.4			3.50	+0.21	
Hamilton, Bermuda	29.89	30.05	0.0	69.0	+ 0.3	73.8	64.2	5.50	+1.12	
Dawson, Yukon										

TABLE VI.—*Heights of rivers referred to zeros of gages, November, 1905.*

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water. Height.	Highest water. Date.	Lowest water. Height.	Lowest water. Date.	Mean stage.	Monthly range.
	Miles.	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Milk River.								
Havre, Mont. (1)	237	9	2.5	18-25	2.2	11-16	2.4	0.3
James River.								
Huron, S. Dak. (2)	139	9	0.2	27, 28	0.0	2-7, 10-13, 18-20, 24, 25	0.0	0.2
Republican River.								
Clay Center, Kans	42	18	6.9	28, 29	6.4	1, 2	6.7	0.5
Smoky Hill River.								
Abilene, Kans	45	22	1.8	26	0.9	1	1.4	0.9
Kansas River.								
Manhattan, Kans	116	18	4.3	7, 8	3.0	1-3	3.4	1.3
Topeka, Kans	87	21	7.6	28, 29	5.9	11	6.6	1.7
Missouri River.								
Bismarck, N. Dak	1,309	14	0.0	11-13	− 0.9	30	−0.3	0.9
Sioux City, Iowa	784	19	5.1	28, 29	4.3	3-6	4.7	0.8
Blair, Nebr	705	15	5.5	29	3.8	30	4.9	1.7
Omaha, Nebr	669	18	5.5	30	4.2	6	4.7	1.3
St. Joseph, Mo	481	10	3.6	8	1.5	4	2.5	2.1
Kansas City, Mo	388	21	9.6	10	6.8	5	7.9	2.8
Glasgow, Mo	231	18	8.3	30	5.5	2	6.6	2.8
Boonville, Mo	199	20	10.5	11	8.1	4	8.9	2.4
Hermann, Mo	103	24	11.6	6	8.0	27	9.9	3.6
Minnesota River.								
Mankato, Minn	127	18	5.6	29	2.6	2, 4	3.4	3.0
St. Croix River.								
Stillwater, Minn. (3)	23	11	6.6	10, 11	5.2	23-28	5.9	1.4
Red Cedar River.								
Cedar Rapids, Iowa	77	14	3.9	7	3.3	1-4	3.5	0.6
Iowa River.								
Iowa City, Iowa	57	......	2.1	8, 9	− 0.1	1, 2	0.8	2.2
Des Moines River.								
Des Moines, Iowa	205	19	4.3	11, 12	3.2	2-5	3.7	1.1
Illinois River.								
La Salle, Ill	197	18	12.1	8, 9, 29, 30	11.1	19, 23, 25-27	11.6	1.0
Peoria, Ill	135	14	8.2	1, 10, 14	7.4	28	7.9	0.8
Red Bank Creek.								
Brookville, Pa	42	8	2.5	29	0.2	1-5, 9-28	0.4	2.3
Clarion River.								
Clarion, Pa	32	10	6.4	30	1.5	27-28	2.4	4.9
Conemaugh River.								
Johnstown, Pa	64	7	6.9	29	0.8	28	1.5	6.1
Allegheny River								
Warren, Pa	177	14	6.9	30	0.9	2, 3	2.2	6.0
Franklin, Pa	114	15	8.6	30	1.8	1	3.1	6.8
Parker, Pa	73	20	8.0	30	1.7	25, 26	3.0	6.3
Freeport, Pa	29	20	13.5	30	3.0	26, 27	5.3	10.5
Springdale, Pa	17	27	19.8	30	7.8	24	9.6	12.0
Cheat River.								
Rowlesburg, W. Va	36	14	5.0	30	1.7	27, 28	2.2	3.3
Youghiogheny River.								
Confluence, Pa	59	10	5.0	29	0.7	5-7, 26-28	1.1	4.3
West Newton, Pa	15	23	8.5	30	0.4	24, 28	1.3	8.1
Monongahela River.								
Weston, W. Va	161	18	2.7	30	− 0.2	5, 13-15	0.3	2.9
Fairmont, W. Va	119	25	19.5	30	14.0	19, 21	14.8	5.5
Greensboro, Pa	81	18	14.9	30	7.0	5, 16, 17, 23	7.5	7.9
Lock No. 4, Pa	40	28	18.0	30	6.9	15-18	7.6	11.1
Beaver River.								
Ellwood Junction, Pa	10	14	4.2	30	0.7	16	1.6	3.5
Muskingum River.								
Zanesville, Ohio	70	25	12.5	30	8.2	26	9.0	4.3
Beverly, Ohio	20	25	10.4	30	4.8	24-27	5.9	5.6
Little Kanawha River.								
Glenville, W. Va	77	20	5.0	30	− 0.4	15	1.2	5.4
Creston, W. Va	38	20	13.5	30	2.4	5	3.9	11.1
New River.								
Radford, Va	155	14	0.2	1-4	− 0.4	28-30	−0.1	0.6
Hinton, W. Va	95	14	1.6	22, 24	1.3	17-19	1.4	0.3
Great Kanawha River.								
Charleston, W. Va	58	30	7.5	13, 22	6.8	1, 19	7.2	0.7
Scioto River.								
Columbus, Ohio	110	17	4.0	7	1.6	23	2.7	2.4
Licking River.								
Falmouth, Ky	30	25	24.8	29	1.5	15-19	3.3	23.3
Miami River.								
Dayton, Ohio	77	18	3.1	7	1.2	23-28	1.7	1.9
Kentucky River.								
Jackson, Ky	287	24	6.5	30	4.8	15-21	5.3	1.7
Beattyville, Ky	254	30	4.0	30	0.1	27, 28	0.5	3.9
High Bridge, Ky	117	17	14.3	30	9.2	16, 17, 21-25	9.7	5.1
Frankfort, Ky	65	31	10.6	29	5.9	14-19, 21-24	6.4	4.7
Wabash River.								
Mount Carmel, Ill	75	15	7.3	9	3.2	28-30	4.8	4.1
Cumberland River.								
Burnside, Ky	518	50	9.9	30	0.8	19-21	1.6	9.1
Celina, Tenn	383	45	13.9	30	1.7	19-21	3.3	12.2
Carthage, Tenn	308	40	10.4	30	1.5	18, 25	2.8	8.9
Nashville, Tenn	193	40	12.6	1	7.8	18-21, 24	8.7	4.8
Clarksville, Tenn	126	42	18.6	29	3.4	22	6.6	15.2
Powell River.								
Tazewell, Tenn	44	20	0.9	1	0.3	14-20, 22, 23	0.4	0.6
Clinch River.								
Speers Ferry, Va	156	20	− 0.1	30	− 0.8	2, 16, 17, 19	−0.6	0.7
Clinton, Tenn	52	25	4.3	1	2.5	21-23	3.1	1.8
South Fork Holston River.								
Bluff City, Tenn	35	15	0.3	1-9, 19-28, 30	0.2	10-18, 29	0.3	0.1
Holston River.								
Rogersville, Tenn	103	14	1.5	1-4	1.2	19-29	1.3	0.3
French Broad River.								
Asheville, N. C	144	6	− 0.5	1-7, 22	− 0.6	8-21, 23-30	−0.6	0.1
Leadvale, Tenn	70	15	− 1.7	20	− 2.0	1-10, 12-19, 22-29	−2.0	0.3
Little Tennessee River.								
McGhee, Tenn	17	20	2.8	21	2.2	2-5, 15-19, 30	2.3	0.6
Hiwassee River.								
Charleston, Tenn	18	22	1.6	1	0.3	16	0.8	1.3
Tennessee River.								
Knoxville, Tenn	635	29	0.6	1	0.3	13-19, 27-29	0.4	0.3
Loudon, Tenn	590	25	1.0	1	0.4	17-19	0.6	0.6
Kingston, Tenn	556	25	1.6	1	1.0	14-20	1.2	0.6
Chattanooga, Tenn	452	33	2.6	1	1.2	1, 9	1.6	1.4
Bridgeport, Ala	402	24	1.4	1	0.4	16-21	0.6	1.0
Guntersville, Ala	349	31	3.5	1	1.4	22-25	1.9	2.1
Florence, Ala	255	16	1.8	1	0.0	20-22	0.5	1.8
Riverton, Ala	225	26	3.9	1	1.3	21	2.0	2.6
Johnsonville, Tenn	95	21	3.4	2, 3	1.1	23-29	1.8	2.3
Ohio River.								
Pittsburg, Pa	966	22	15.0	30	5.0	1	6.5	10.0
Davis Island Dam, Pa	960	25	16.6	30	4.3	25	5.7	12.3
Beaver Dam, Pa	925	27	18.5	30	5.4	25, 26	7.4	13.1
Wheeling, W. Va	875	36	16.3	30	5.0	26-28	6.7	11.3
Parkersburg, W. Va	785	36	16.0	30	6.2	28	7.8	9.8
Point Pleasant, W. Va	703	39	15.3	30	4.5	28	6.4	10.8
Huntington, W. Va	660	50	15.9	30	7.9	28	9.7	8.0
Catlettsburg, Ky	651	50	16.9	30	6.5	28	8.6	10.4
Portsmouth, Ohio	612	50	18.1	30	7.8	28	9.9	10.3
Maysville, Ky	559	50	15.1	30	8.0	28	9.9	7.1
Cincinnati, Ohio	499	50	20.5	30	10.2	28	12.0	10.3
Madison, Ind	413	46	17.9	30	9.3	23, 24	10.9	8.6
Louisville, Ky	367	28	7.9	30	4.3	24	5.2	3.6
Evansville, Ind	184	35	14.7	1	7.6	27, 28	9.4	7.1
Mount Vernon, Ind	148	35	14.4	1	7.1	27	9.1	7.3
Paducah, Ky	47	40	13.9	1	5.7	28	8.3	8.2
Cairo, Ill	1	45	22.8	1	13.6	28	17.3	9.2
St. Francis River.								
Marked Tree, Ark	104	17	7.2	30	4.7	1-3	5.0	2.5
Neosho River.								
Neosho Rapids, Kans	326	22	4.5	6	1.2	1-4	1.9	3.3
Iola, Kans	262	10	3.5	6	0.5	21-23	1.1	3.0
Oswego, Kans	184	20	9.3	7	1.0	21-24	2.8	8.3
Fort Gibson, Ind. T	3	22	16.5	3	10.5	25-28	12.0	6.0
Canadian River.								
Calvin, Ind. T	99	10	5.4	29	1.9	1-3	2.9	3.5
Black River.								
Blackrock, Ark	67	12	5.6	1	3.0	28	4.1	2.6
White River.								
Calicorock, Ark	272	15	7.0	7	1.2	28, 29	2.8	5.8
Batesville, Ark	217	18	8.6	8	3.5	25, 26	4.9	5.1
Newport, Ark	185	26	9.8	11	3.0	28	5.5	6.8
Clarendon, Ark	75	30	18.5	14, 15	12.3	28, 29	15.7	6.2
Arkansas River.								
Wichita, Kans	832	10	0.6	27	− 0.4	3, 4, 22, 23	−0.1	1.0
Tulsa, Ind. T	551	16	4.0	11	2.7	23-25	3.0	1.3
Webbers Falls, Ind. T	465	23	9.5	2, 3, 8, 9	5.6	21-26	6.9	3.9
Fort Smith, Ark	403	22	10.3	9	4.5	24, 28	6.8	5.8
Dardanelle, Ark	256	21	11.4	6	4.5	23, 24	6.8	6.9
Little Rock, Ark	176	23	12.6	7	5.8	25	8.6	6.8
Yazoo River.								
Greenwood, Miss	175	38	4.4	14-16	1.9	30	3.3	2.5
Yazoo City, Miss	80	25	2.4	6	− 1.2	30	0.8	3.6
Ouachita River.								
Camden, Ark	304	39	25.4	14	7.7	6	14.4	17.7
Monroe, La	122	40	18.3	21	11.3	9	15.9	7.0
Red River.								
Arthur City, Tex	688	27	12.9	10	5.6	6	8.9	7.3
Fulton, Ark	515	28	22.5	13, 15	9.5	5	15.1	13.0
Shreveport, La	327	29	14.0	16, 17	5.0	8	9.9	9.0
Alexandria, La	118	33	18.6	18, 19	9.9	30	14.4	8.7
Mississippi River.								
St. Cloud, Minn	2,034	4	1.8	29, 30	0.9	18-24	1.2	0.9
St. Paul, Minn. (3)	1,954	14	5.9	29	4.8	22-24	5.2	1.1
Red Wing, Minn	1,914	14	4.8	1, 2	3.7	24-26	4.2	1.1
Reeds Landing, Minn	1,884	12	4.7	1	3.5	25-27	4.0	1.2
La Crosse, Wis	1,819	12	6.1	1	4.5	28	5.1	1.6
Prairie du Chien, Wis	1,759	18	6.8	1	4.9	24-30	5.6	1.9
Dubuque, Iowa	1,699	18	7.3	1, 2	5.4	25-27	6.1	1.9
Clinton, Iowa	1,629	16	6.6	1-7	5.0	27, 28	5.8	1.6
Leclaire, Iowa	1,609	10	4.5	1-7	3.1	28	3.9	1.4
Davenport, Iowa	1,593	15	5.9	2-4	4.4	29	5.2	1.5
Muscatine, Iowa	1,562	16	6.7	2-5, 7-9	5.4	27, 29	6.1	1.3
Galland, Iowa	1,472	8	3.4	9	2.5	25, 26	2.9	0.9
Keokuk, Iowa	1,463	15	6.2	9	4.4	24-27	5.1	1.8
Warsaw, Ill	1,458	18	9.2	9	7.4	24	8.1	1.8
Hannibal, Mo	1,402	13	7.7	11	5.3	25	6.2	2.4
Grafton, Ill	1,306	23	8.9	7, 8, 11, 12	7.1	26-30	7.9	1.8
St. Louis, Mo	1,264	30	14.3	7	9.1	27, 28	11.8	5.2
Chester, Ill	1,189	30	12.6	8	8.1	28	10.4	4.5
New Madrid, Mo	1,003	34	18.7	1	10.8	29	14.0	7.9
Luxora, Ark	905	33	12.0	1, 2	5.4	30	8.1	6.6
Memphis, Tenn	843	33	15.1	2	7.6	30	10.6	7.5
Helena, Ark	767	42	21.0	3	12.0	30	15.9	9.0
Arkansas City, Ark	635	42	25.1	4	15.4	30	20.4	9.7
Greenville, Miss	595	42	20.3	4, 5	12.1	30	16.5	8.2
Vicksburg, Miss	474	45	21.6	6	12.4	30	17.7	9.2
Natchez, Miss	373	46	23.2	10	15.5	30	20.2	7.7
Baton Rouge, La	240	35	16.3	10	10.3	30	13.9	6.0
Donaldsonville, La	188	28	11.7	10	7.7	30	10.0	4.0
New Orleans, La	108	16	7.7	10, 11	5.8	30	6.9	1.9
Atchafalaya River.								
Simmesport, La	127	33	20.9	11	14.6	30	18.5	6.3
Melville, La	103	31	23.9	12	18.0	1	21.6	5.9
Morgan City, La	19	8	4.0	*	3.0	11	......	1.0
Grand River.								
Grand Rapids	38	11	2.6	10	1.7	3-5	2.0	0.9
Penobscot River.								
Mattawamkeag, Me. (2)	87	..	9.3	3	8.3	1	8.9	1.0
West Enfield, Me	60	..	2.3	20	1.1	26	1.8	1.2

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TABLE VI.—*Heights of rivers referred to zeros of gages*—Continued.

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water. Height.	Highest water. Date.	Lowest water. Height.	Lowest water. Date.	Mean stage.	Monthly range.
	Miles	Feet.	Feet.		Feet.		Feet.	Feet.
Kennebec River.								
Winslow, Me	46	......	4.3	13, 28	1.4	25	3.6	2.9
Merrimac River.								
Franklin Junction, N. H.	110	......	4.6	7, 8	3.9	2,3,20-23	4.2	0.7
Concord, N. H.	94	......	1.6	8, 9	0.9	3, 20-24, 27-29	1.1	0.7
Manchester, N. H	68	......	4.1	12	2.7	20	3.3	1.4
Connecticut River.								
Wells River, Vt.*	255	......	25.9	2, 3, 6, 7	23.5	17, 18	25.0	2.4
Whiteriver Junction, Vt.	209	......	7.7	30	4.2	26	5.5	3.5
Bellows Falls, Vt.	170	12	3.4	5, 12, 19	1.8	21	2.6	1.6
Holyoke, Mass	84	9	4.1	12	0.5	25	2.9	3.6
Hartford, Conn.	50	13	4.6	9	1.9	27, 28	3.3	2.7
Housatonic River.								
Gaylordsville, Conn.	44	15	4.9	30	3.6	23	4.0	1.3
Mohawk River.								
Tribeshill, N. Y	42	12	4.0	30	0.5	1, 23-25	1.4	3.5
Schenectady, N. Y.	19	15	5.0	30	1.0	1, 22-28	1.8	4.0
Hudson River.								
Glens Falls, N. Y	197	20	5.1	8-10	3.6	26	4.6	1.5
Troy, N. Y.	154	14	4.9	22	2.5	2	3.7	2.4
Albany, N. Y.	147	12	4.5	9, 15, 16	1.1	21	3.1	3.4
Pompton River.								
Pompton Plains, N. J.	6	8	4.5	30	3.9	18-29	4.0	0.6
Passaic River.								
Chatham, N. J	69	7	3.9	30	2.1	11-16, 21-28	2.2	1.8
Lehigh River.								
Mauchchunk, Pa	45	15	5.7	30	4.1	17-23, 26, 27	4.4	1.6
Schuylkill River.								
Reading, Pa.	66	12	2.9	30	0.4	23, 24, 26-28	0.7	2.5
Delaware River.								
Hancock (E. Branch), N. Y.	269	12	7.0	30	3.1	24-28	3.5	3.9
Hancock (W. Branch), N. Y.	269	10	6.3	30	3.1	22, 24, 26-28	3.6	3.2
Port Jervis, N. Y	204	14	4.1	30	0.3	27, 28	0.8	3.8
Phillipsburg, N. J.	142	26	3.5	30	1.1	25	1.7	2.4
Trenton, N. J.	92	18	3.0	30	1.0	21-27	1.4	2.0
North Branch Susquehanna.								
Binghamton, N. Y.	183	16	7.3	30	2.4	22-28	2.8	4.9
Towanda, Pa	139	16	6.0	30	1.4	26-29	2.0	4.6
Wilkes-Barre, Pa.	60	17	5.6	10	3.6	26, 27	4.4	2.0
West Branch Susquehanna.								
Renovo, Pa.	90	16	8.4	30	1.1	22-28	1.9	7.3
Williamsport, Pa.	39	20	7.4	30	1.6	23-26, 28	2.5	5.8
Juniata River.								
Huntingdon, Pa.	90	24	5.7	30	3.1	23, 24	3.5	2.6
Susquehanna River.								
Harrisburg, Pa.	69	17	2.9	30	1.7	26-28	2.2	1.2
Shenandoah River.								
Riverton, Va.	58	22	−0.5	1-30	−0.5	1-30	−0.5	0.0
Potomac River.								
Cumberland, Md.	290	8	4.0	30	2.3	23-28	2.6	1.7
Harpers Ferry, W. Va.	172	18	1.0	1	−0.6	24-26	−0.1	1.6
James River.								
Buchanan, Va.	305	12	2.1	1	1.9	14-21, 27-30	2.0	0.2
Lynchburg, Va.	260	18	0.1	1-20	0.0	21-30	0.1	0.1
Columbia, Va.	167	18	3.3	1	2.5	26-30	2.8	0.8
Richmond, Va.	111	12	0.7	1, 2	−0.6	19	−0.2	1.3
Dan River.								
Danville, Va.	55	8	0.1	1	−0.3	12-14, 27-30	−0.2	0.4
Roanoke River.								
Clarksville, Va	196	12	−0.3	7, 21	−0.6	15	−0.5	0.3
Weldon, N. C.	129	30	8.9	1	8.4	15	8.7	0.5
Tar River.								
Tarboro, N. C	46	25	2.5	24	1.4	17	1.8	1.1
Greenville, N. C.	21	22	4.3	1	3.0	15-17, 21	3.4	1.3
Haw River.								
Moncure, N. C.	171	25	8.5	22, 23	4.4	10	7.2	4.1
Cape Fear River.								
Fayetteville, N. C	112	38	4.5	2	2.0	17-19	3.0	2.5
Waccamaw River.								
Conway, S. C.	40	7	2.6	1-4	1.0	27	1.8	1.6
Pedee River.								
Cheraw, S. C	149	27	1.9	1, 2, 12	1.4	18	1.7	0.5
Smiths Mills, S. C.	51	16	3.3	1, 2	1.7	23	2.3	1.6
Lynch Creek.								
Effingham, S. C.	35	12	5.7	7	3.3	30	4.3	2.4
Black River.								
Kingstree, S. C.	45	12	2.9	18	1.0	20	2.0	1.9
Catawba River.								
Mount Holly, N. C.	28	15	1.7	1-4	1.5	9-20	1.6	0.2
Wateree River.								
Camden, S. C.	37	24	5.0	11	2.9	7, 28	4.2	2.1
Broad River.								
Blairs, S. C	36	14	0.9	2, 7, 22	0.0	17	0.6	0.9
Saluda River.								
Chappels, S. C.	56	14	3.2	23	0.7	7	1.6	2.5
Congaree River.								
Columbia, S. C	52	15	1.7	11	−0.2	28	0.8	1.9
Santee River.								
St. Stephens, S. C.	50	12	1.2	14	−0.8	20	0.2	2.0
Edisto River.								
Edisto, S. C.	75	6	1.8	17, 18	0.0	3-10, 27, 28	0.9	1.8
Broad River.								
Carlton, Ga.	30	11	2.2	26	1.6	1-6, 8, 9, 16-20, 25	1.7	0.6
Savannah River.								
Calhoun Falls, S. C.	347	15	3.6	11	2.7	19-21	2.9	0.9
Augusta, Ga.	268	32	7.6	12	4.9	4	6.0	2.7
Oconee River.								
Milledgeville, Ga.	147	25	3.7	12	0.7	5, 7	1.3	3.0
Dublin, Ga	79	30	1.4	13	−0.9	5-9	−0.4	2.3
Ocmulgee River.								
Macon, Ga.	203	18	4.4	12	0.3	7	0.8	4.1
Abbeville, Ga.	96	11	4.0	15	0.1	11	1.4	3.9
Flint River.								
Woodbury, Ga.	227	10	1.1	12	0.0	6	0.3	1.1
Montezuma, Ga.	152	20	4.7	13	1.9	9	2.8	2.8
Albany, Ga.	90	20	3.1	14	0.3	9	1.1	2.8
Bainbridge, Ga	29	22	4.2	15, 17	2.3	10	3.0	1.9
Chattahoochee River.								
Oakdale, Ga	305	18	1.5	26	0.5	3-9, 12, 21, 23, 24	0.8	1.0
West Point, Ga	239	20	3.0	12	1.7	6, 9	2.0	1.3
Eufaula, Ala	90	40	3.0	14	0.5	7-9	1.3	2.5
Alaga, Ala. (5)	30	25	3.9	15	1.6	5, 6	2.1	2.3
Coosa River.								
Rome, Ga.	271	30	0.8	27	0.3	18, 19	0.5	0.5
Gadsden, Ala.	144	22	1.0	29	0.0	7-10, 19-22	0.4	1.0
Lock No. 4, Ala.	116	17	1.0	30	0.3	8-10, 19-22	0.5	0.7
Wetumpka, Ala	6	45	2.6	13, 14	1.2	9, 23	1.8	1.4
Tallapoosa River.								
Milstead, Ala.	38	35	2.4	31, 14	1.3	6-9, 21	1.6	1.1
Alabama River.								
Montgomery, Ala.	265	35	0.9	14	−0.2	23, 24	0.2	1.1
Selma, Ala	212	35	1.2	15-17	0.0	28-30	0.5	1.2
Black Warrior River.								
Tuscaloosa, Ala.	90	43	7.0	11	5.2	9	5.8	1.8
Tombigbee River.								
Columbus, Miss	303	33	0.8	13, 14	−2.5	9	−1.6	3.3
Vienna, Ala.	233	42	3.8	14	0.6	25	1.5	3.2
Demopolis, Ala.	155	35	4.3	16	−0.1	9-11	1.4	4.4
Leaf River.								
Hattiesburg, Miss	60	20	4.0	15	3.0	5, 6, 30	3.4	1.0
Chickasawhay River.								
Enterprise, Miss	144	18	1.9	10-12	1.4	4, 5	1.6	0.5
Shubuta, Miss.	106	25	5.5	1	3.8	23-30	4.3	1.7
Pascagoula River.								
Merrill, Miss.	78	20	3.9	13	1.2	9	2.1	2.7
Pearl River.								
Jackson, Miss	242	20	4.5	11	1.8	29, 30	2.8	2.7
Columbia, Miss.	110	14	8.9	11, 12	4.8	29, 30	5.8	4.1
Sabine River.								
Logansport, La.	315	25	18.6	12	6.8	1	11.9	11.8
Neches River.								
Rockland, Tex	105	20	8.4	12	1.4	1, 2	4.8	7.0
Beaumont, Tex.	18	10	2.7	28	1.1	8, 30	1.8	1.6
Trinity River.								
Dallas, Tex.	320	25	28.1	12	3.1	4	8.8	25.0
Long Lake, Tex.	211	35	22.5	18	4.3	5	12.0	18.2
Riverside, Tex.	112	40	12.0	19	2.5	5	7.5	9.5
Liberty, Tex	20	25	14.5	13, 14	6.2	7	11.0	8.3
Brazos River.								
Kopperl, Tex.	345	21	2.2	10	−0.2	29, 30	0.5	2.4
Waco, Tex.	285	24	5.0	13	2.7	5-8	3.5	2.3
Valley Junction, Tex.	215	40	5.4	22	2.2	5-8	3.1	3.2
Hempstead, Tex	140	40	5.5	14	1.0	4, 5, 7, 8	2.5	4.5
Booth, Tex	61	39	6.9	16	4.2	1	5.3	2.7
Colorado River.								
Ballinger, Tex. (6)	489	21	1.9	9-12	1.7	24-30	1.8	0.2
Austin, Tex.	214	18	3.8	10	1.0	9	1.7	2.8
Columbus, Tex.	98	24	10.0	9	6.9	3-6	7.6	3.1
Guadalupe River.								
Gonzales, Tex	112	22	4.0	10	0.8	1-4, 23, 27, 29, 30	1.0	3.2
Victoria, Tex	35	16	9.3	11	1.6	1, 2	2.6	7.7
Red River of the North.								
Moorhead, Minn. (3)	284	26	9.0	3-7	8.6	29	8.8	0.4
Kootenai River.								
Bonners Ferry, Idaho. (7)	123	24	1.8	1	0.0	27	0.8	1.8
Pend d'Oreille River.								
Newport, Wash.	86	14	−0.7	1-13, 23	−0.9	17-20, 24, 29, 30	−0.8	0.2
Snake River.								
Lewiston, Idaho	144	24	1.4	27	0.7	6	1.0	0.7
Riparia, Wash.	67	30	2.0	6-8	1.7	20-22	1.8	0.3
Columbia River.								
Wenatchee, Wash	473	40	8.0	9-13	7.1	30	7.7	0.9
Umatilla, Oreg.	270	25	3.0	1, 29, 30	1.7	17	2.4	1.3
The Dalles, Oreg.	166	40	3.6	1	1.4	17, 21-24	2.0	2.2
Willamette River.								
Albany, Oreg.	118	20	3.5	30	1.0	13-18	1.7	2.5
Salem, Oreg	84	20	2.4	21	0.0	15-18	0.8	2.4
Portland, Oreg.	12	15	4.6	27	1.2	6	2.3	3.4
Sacramento River.								
Red Bluff, Cal.	201	23	1.3	29, 30	0.3	1-15	0.5	1.0
Sacramento, Cal.	64	25	7.4	30	6.5	5-7, 21	6.7	0.9

(1) Frozen for 6 days. (2) Frozen for 2 days. (3) Frozen for 1 day. (4) Frozen for 12 days. (5) 25 days only. (6) 29 days only. (7) Frozen 3 days. * On various dates.

Honolulu, T. H., latitude, 21° 19′ north, longitude 157° 52′ west; barometer above sea, 38 feet; gravity correction, —.057 applied. November, 1905.

Day.	Pressure.* 8 a. m.	Pressure.* 8 p. m.	Air temperature. 8 a. m.	Air temperature. 8 p. m.	Air temperature. Maximum.	Air temperature. Minimum.	Moisture. 8 a. m. Wet.	Moisture. 8 a. m. Relative humidity.	Moisture. 8 p. m. Wet.	Moisture. 8 p. m. Relative humidity.	Wind. 8 a. m. Direction.	Wind. 8 a. m. Velocity.	Wind. 8 p. m. Direction.	Wind. 8 p. m. Velocity.	Precipitation. 8 a. m.	Precipitation. 8 p. m.	Clouds. 8 a. m. Amount.	Clouds. 8 a. m. Kind.	Clouds. 8 a. m. Direction.	Clouds. 8 p. m. Amount.	Clouds. 8 p. m. Kind.	Clouds. 8 p. m. Direction.
1	29.96	29.93	78.9	76.2	82	72	70.4	66	70.2	74	n.	4	e.	10	T.	0.01	1	S.-cu.	e.	5 4	S.-cu. N.	e. e.
2	29.94	29.95	78.0	75.1	80	74	68.9	63	66.6	64	e.	8	ne.	4	T.	T.	3 2	Ci.-s. S.-cu.	w. e.	2 5	Ci.-cu. S.-cu.	w. e.
3	29.95	29.95	76.0	75.4	82	71	69.2	71	70.0	76	ne.	2	n.	2	0.00	0.00	8 1	Ci.-s. S.-cu.	w. e.	1 5	Ci.-s. S.-cu.	w. e.
4	29.94	29.91	75.6	74.0	80	69	68.1	68	69.8	81	e.	1	e.	6	0.00	0.00	2 2	Ci.-cu. S.-cu.	sw. 0	3 3	Ci.-cu. S.-cu.	w. 0
5	29.95	29.96	75.2	72.0	79	69	69.7	75	71.0	95	ne.	2	ne.	5	0.00	0.03	1	S.-cu.	0	10	N.	?
6	29.98	29.96	74.2	75.0	81	69	69.9	81	69.5	76	n.	2	ne.	6	0.10	0.00	4 2	Ci.-s. S.-cu.	w. ne.	1 1	Cu. S.-cu.	ne. ne.
7	29.95	29.96	77.4	74.0	81	70	70.0	69	68.0	74	nw.	2	s.	2	0.00	0.00	3	S.-cu.	ne.	1	S.-cu.	e.
8	29.96	29.94	76.0	74.1	81	69	69.0	70	67.3	70	e.	2	ne.	4	0.00	0.00	1	Cu.	e	few.	S.-cu.	0
9	30.00	29.98	75.0	73.0	78	67	68.2	71	68.2	79	n.	1	ne.	7	0.00	0.00	few.	S.-cu.	0	few.	S.-cu.	0
10	30.02	29.98	75.5	72.7	78	66	67.8	67	67.2	75	ne.	3	n.	1	0.00	0.00	1	S.-cu.	0	few.	S.-cu.	0
11	29.98	29.95	72.8	72.6	79	68	68.9	82	66.0	71	w.	5	ne.	10	0.00	0.00	3 1	Ci.-s. S.-cu.	n. nw.	9 1	Ci. S.-cu.	0 0
12	29.98	29.98	72.9	73.8	78	69	67.8	77	65.8	65	ne.	12	ne.	11	0.02	T.	8	S.-cu.	ne.	few.	S.-cu.	0
13	30.03	30.05	76.0	73.9	80	71	68.8	69	69.4	80	n.	5	ne.	8	0.00	0.00	1 2	Ci.-s. S.-cu.	? ?	2	S.-cu.	e.
14	30.07	30.09	75.4	74.1	79	71	69.4	74	66.5	67	e.	5	ne	16	T.	T.	5 4	S.-cu. N.	e. e.	9	S.-cu.	e.
15	30.08	30.06	75.5	74.1	79	71	66.0	60	67.1	69	ne.	14	s.	5	0.02	T.	2 4	Cu. S.-cu.	e. e.	8	S.-cu.	e.
16	30.10	30.08	71.4	73.5	78	68	68.2	85	68.0	76	ne.	4	ne.	12	0.17	0.22	10	N.	e.	8	S.-cu.	e.
17	30.10	30.12	76.2	74.5	79	69	69.4	71	67.9	71	ne.	3	ne.	8	0.06	T.	1 3	Cu. S.-cu.	e. e.	4	S.-cu.	e. e.
18	30.12	30.10	75.2	74.0	80	72	68.4	71	68.5	76	ne.	9	e.	8	T.	0.02	8	S.-cu	e.	4 4	S.-cu. N.	e. e.
19	30.10	30.07	76.2	74.7	81	72	68.9	69	69.2	76	se.	9	ne.	5	T.	0.00	2	S.-cu.	e.	2	S.-cu.	e.
20	30.10	30.04	72.5	72.6	79	68	70.1	89	69.9	87	n.	4	nw.	5	0.58	0.06	1 8	Cu. S.-cu.	se. ne.	10	S.-cu.	e.
21	29.99	29.95	77.4	75.2	81	72	69.7	68	69.2	74	e.	4	ne.	4	0.04	0.00	1 2	Ci.-cu. Cu.	0 e.	2	S.-cu.	e.
22	29.97	30.00	77.9	74.6	80	68	70.4	69	69.0	76	e	11	s.	5	0.06	0.16	7 3	Ci.-s. S.-cu.	s. se.	4 6	Ci.-s. S.-cu.	sw. se.
23	30.03	30.07	76.5	75.5	77	73	70.0	72	69.5	74	e.	22	ne.	12	0.48	0.01	1 9	A.-s. S.-cu.	? e.	5 5	S.-cu. N.	e. e.
24	30.06	30.05	75.1	75.0	78	68	69.4	75	67.5	68	e.	10	e.	14	T.	0.04	4	S.-cu.	e.	4 5	S.-cu. N.	e. e.
25	30.06	30.03	75.3	73.6	78	71	66.1	61	67.0	71	ne.	16	e.	13	0.02	0.01	6	S.-cu.	e.	2 8	S.-cu. N.	e. e.
26	30.02	30.04	73.0	75.0	78	70	66.0	69	66.0	62	e.	12	e.	9	0.01	T.	5 4	Ci.-s. S.-cu.	w. e.	8	S.-cu.	e.
27	30.06	30.07	74.5	73.3	78	69	67.8	71	67.8	75	s.	5	ne.	4	0.00	T.	9 1	Ci.-s. S.-cu.	sw. e.	9	S.-cu.	e.
28	30.11	30.08	77.0	74.0	81	70	70.2	71	68.2	75	s.	3	e.	5	0.00	T.	8	S.-cu.	n.	7 2	S.-cu. N.	e. e.
29	30.09	30.04	76.0	74.0	80	68	68.2	67	68.0	74	ne.	4	nw.	3	0.01	0.01	1 2	Ci.-cu. S.-cu.	w. e.	2	S.-cu.	e.
30	30.04	30.00	71.4	73.0	79	66	66.9	79	67.0	73	n.	4	n.	4	0.00	0.04	5 2	Ci.-cu. S.-cu.	w. 0	4	S.-cu.	ne.
31	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Mean	30.025	30.013	75.3	74.1	79.5	69.7	68.7	71.7	68.2	74.1	ne.	6.3	ne.	6.9	1.57	0.61	5.5	S.-cu.	e.	5.8	S.-cu.	e.

Observations are made at 8 a. m. and 8 p. m., local standard time, which is that of 157° 30′ west, and is 5h and 30m slower than 75th meridian time. *Pressure values are reduced to sea level and standard gravity.

RAINFALL IN JAMAICA.

Through the kindness of Mr. H. H. Cousins, chemist to the government of Jamaica and now in charge of the meteorological service of that island, we have received the following table:

Comparative table of rainfall.

[Based upon the average stations only.]

NOVEMBER, 1905.

Divisions.	Relative area.	Number of stations.	Rainfall.	
			1905.	Average.
	Per cent.		*Inches.*	*Inches.*
Northeastern division	25	23	9.55	13.38
Northern division	22	49	3.77	6.11
West-central division	26	25	7.21	5.48
Southern division	27	27	6.55	4.54
Means	100		6.77	7.38

The rainfall for November was therefore below the average for the whole island. The greatest fall, 21.73 inches, was recorded at Manchioneal, in the northeastern division, while the least, 1.28 inches, was recorded at Lucea, in the northern division.

Chart I. Tracks of Centers of High Areas, November, 1905.

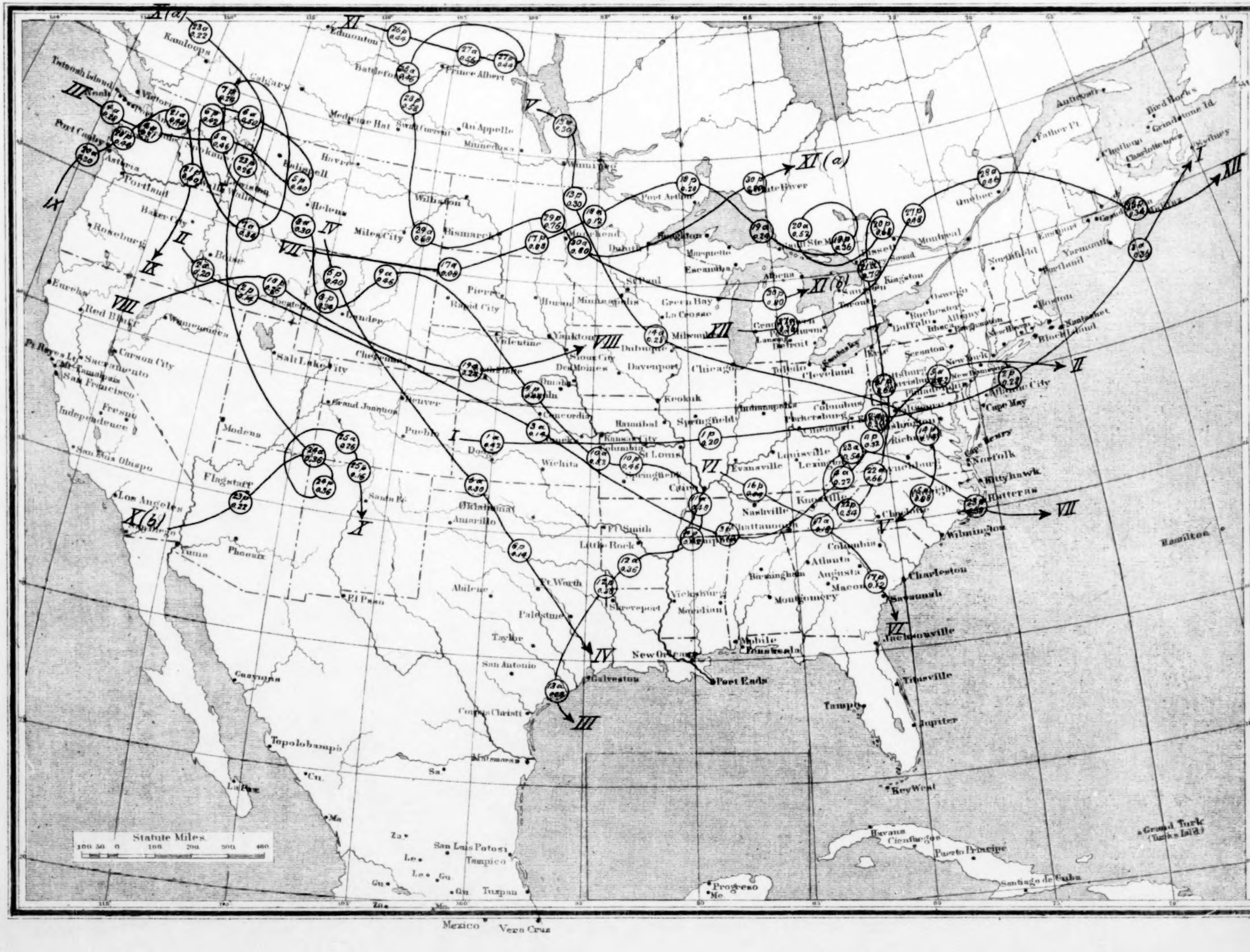

Chart II. Tracks of Centers of Low Areas, November, 1905.

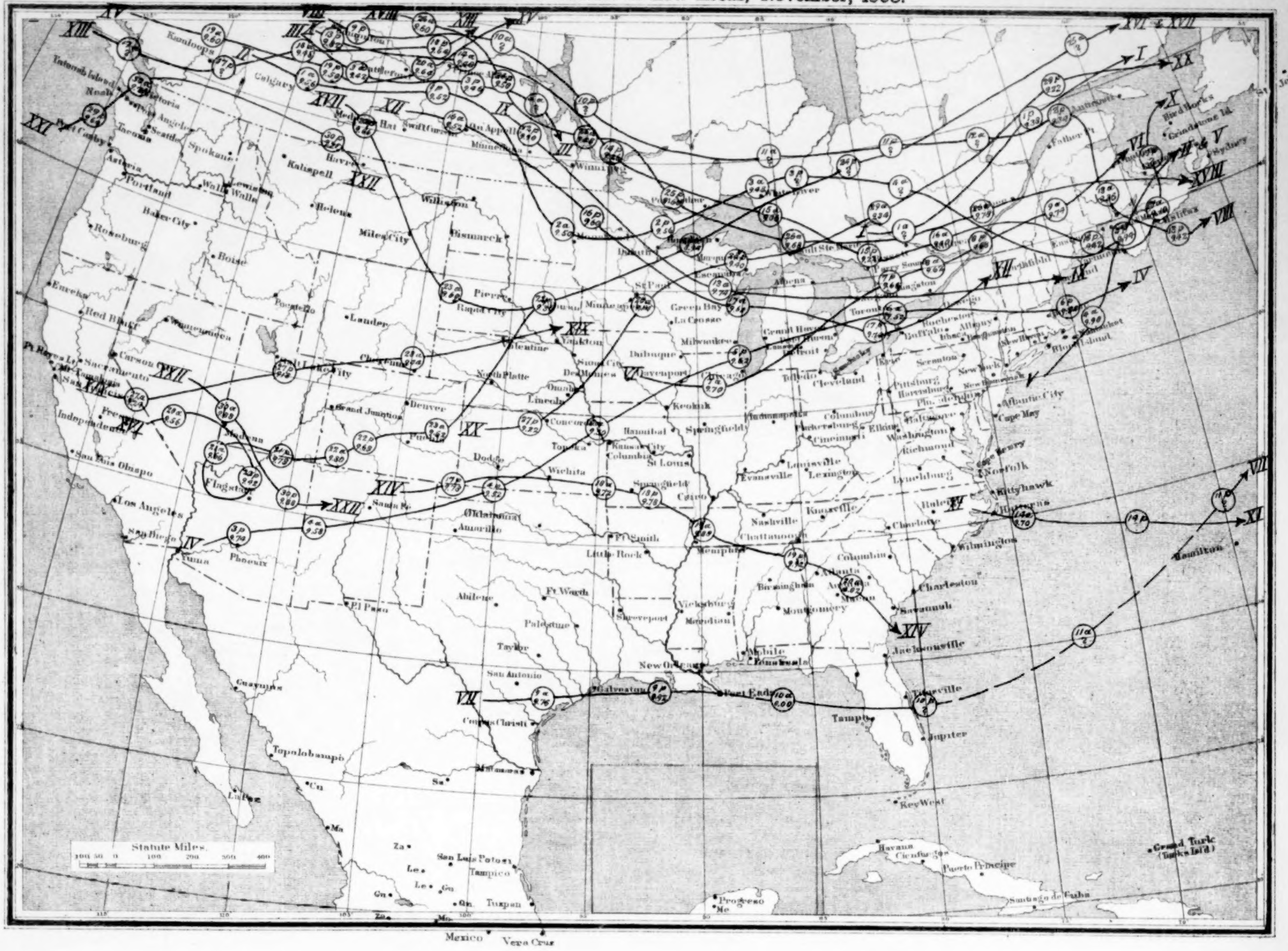

Chart III. Total Precipitation, November, 1905.

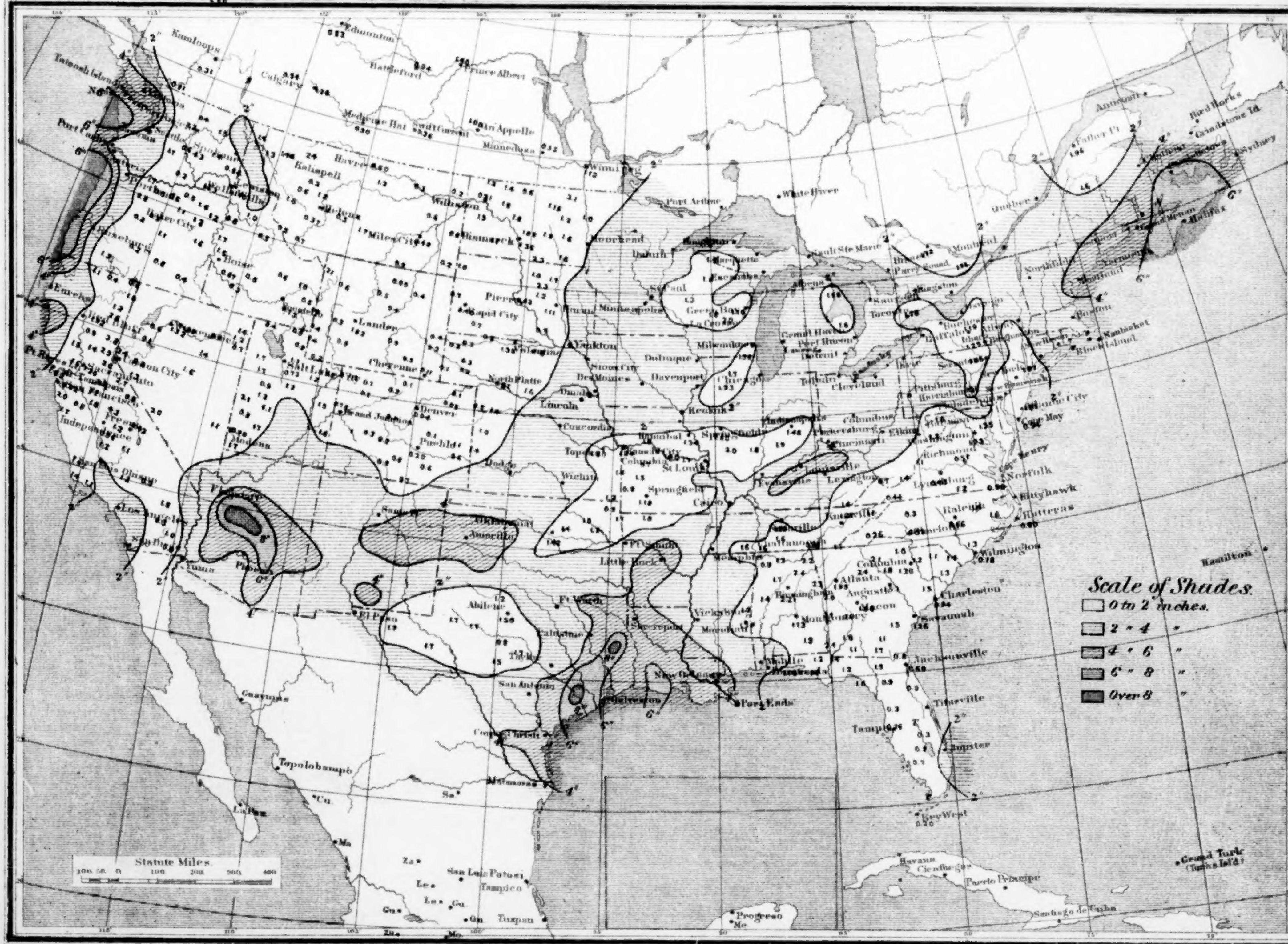

Chart IV. Percentage of Clear Sky, November, 1905.

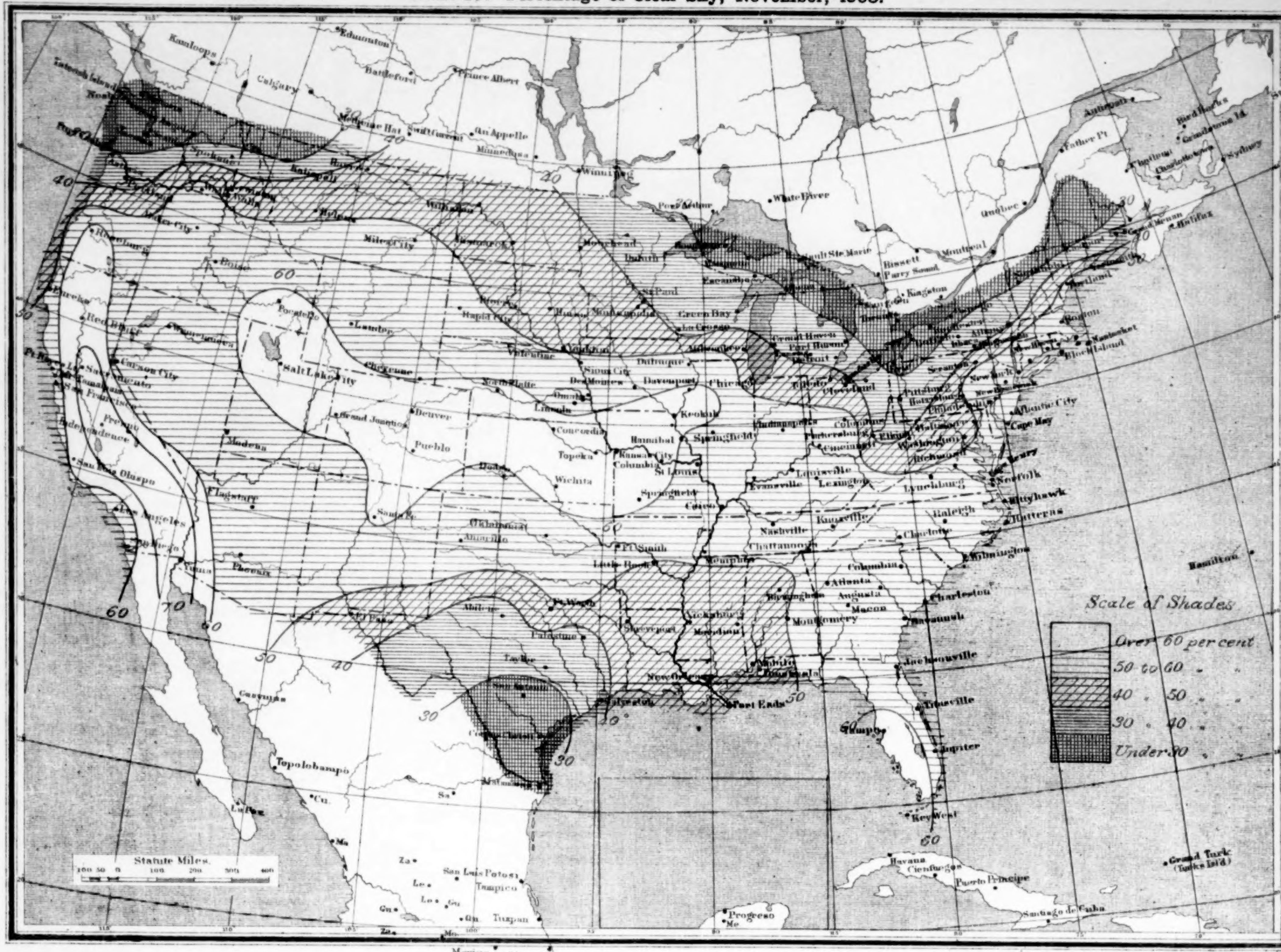

Chart V. Hydrographs for Seven Principal Rivers of the United States, November, 1905.

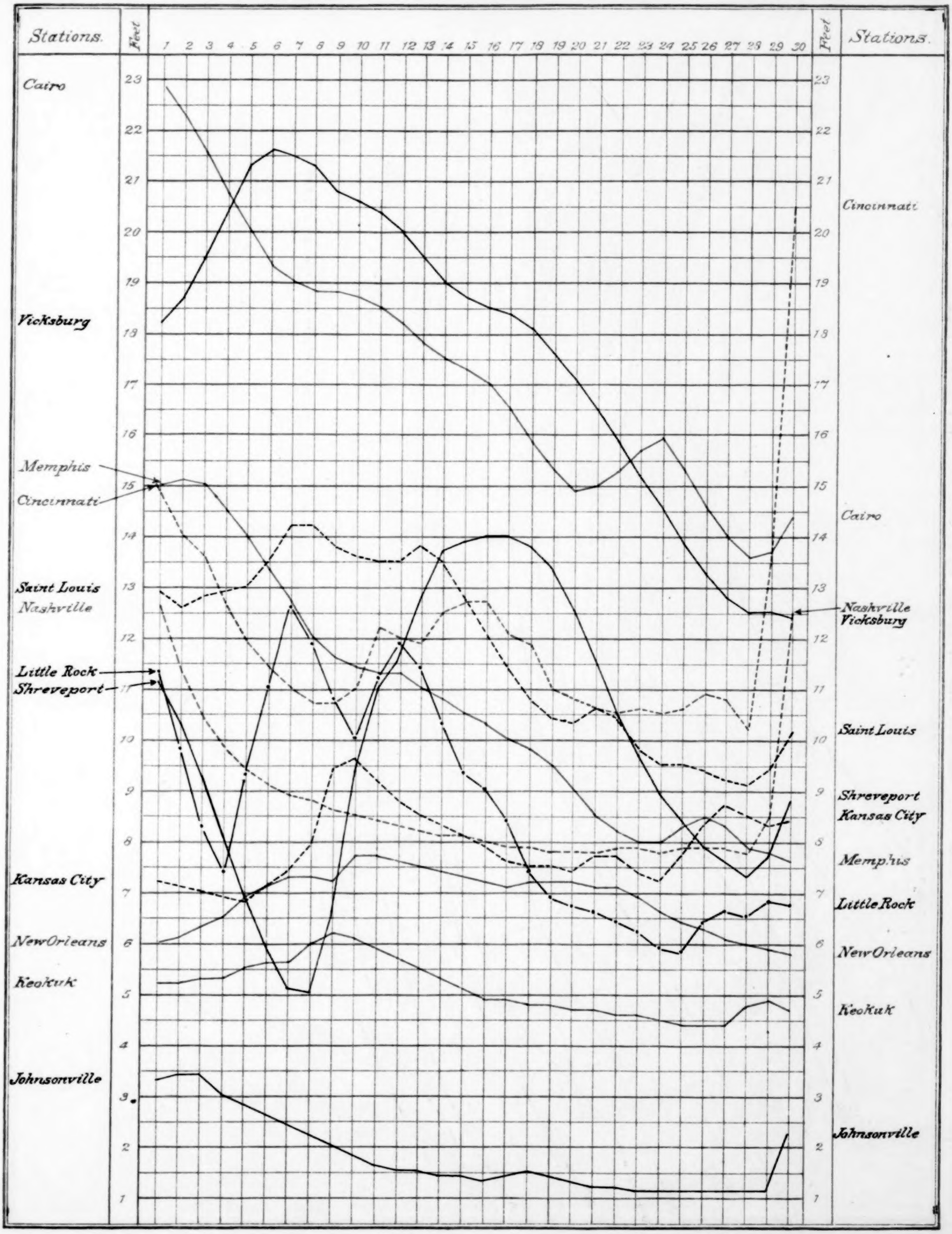

Chart VI. Isobars and Isotherms at 10,000 feet, November, 1905.

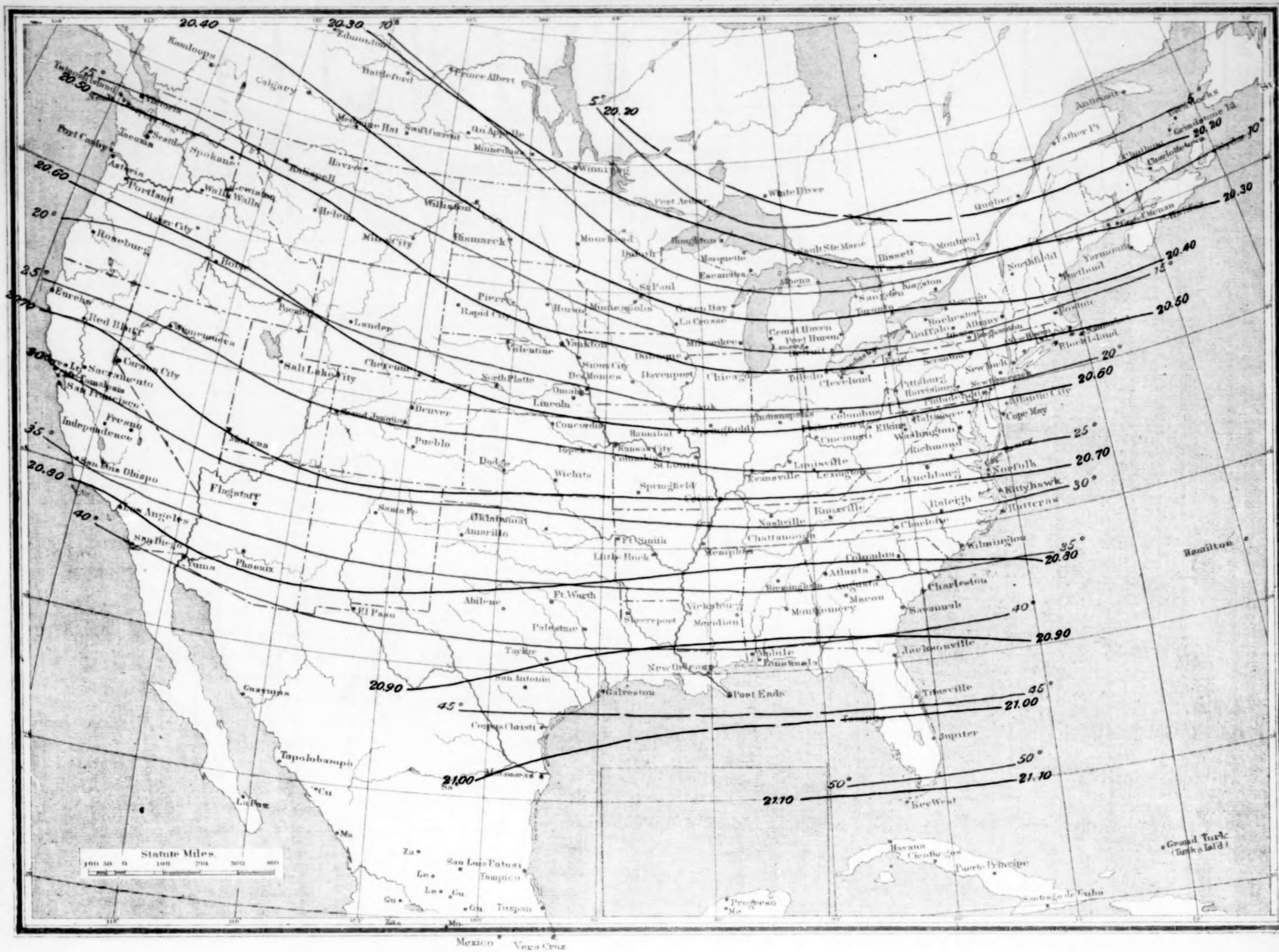

Chart VII. Isobars and Isotherms at 3500 feet, November, 1905.

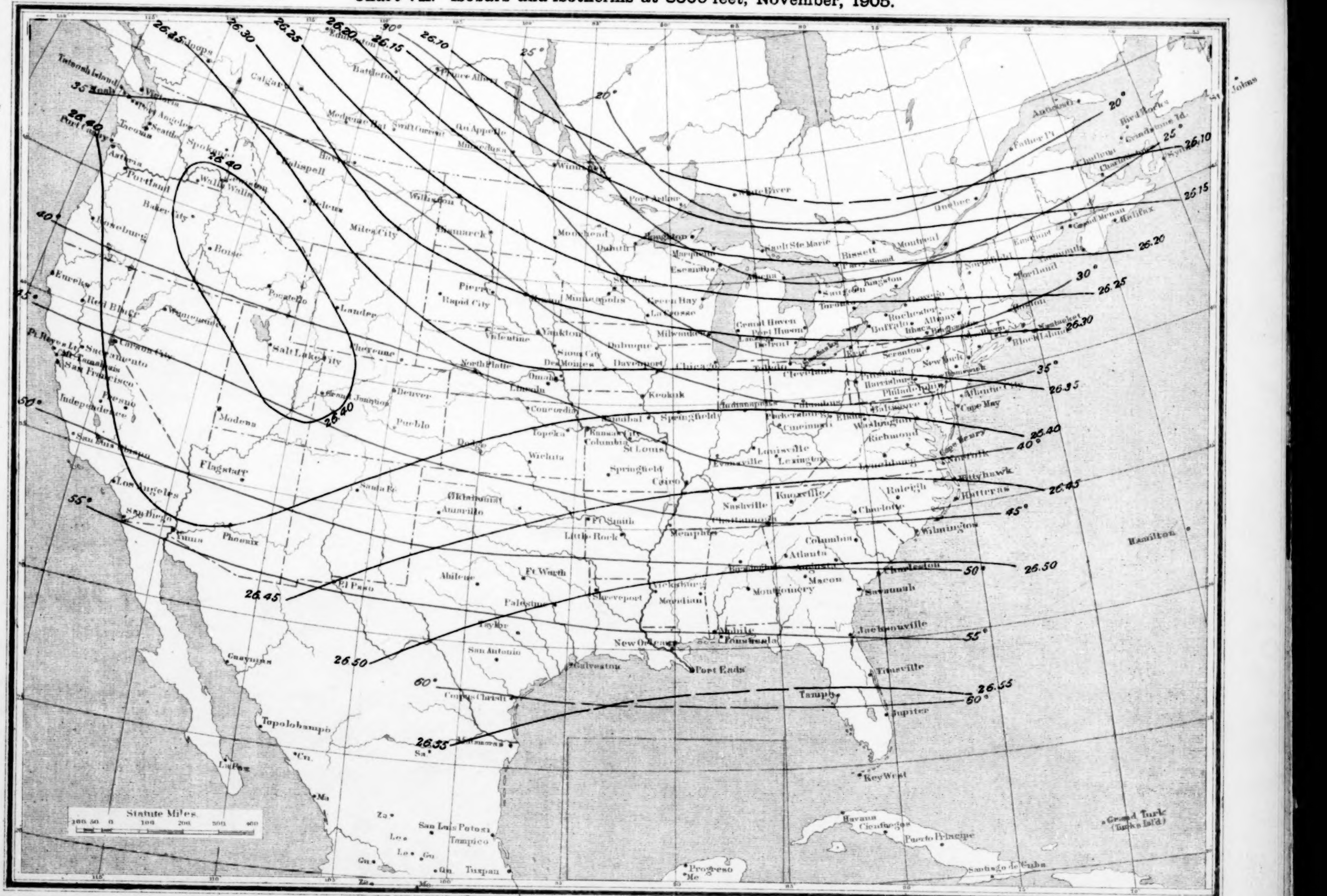

Chart VIII. Isobars and Isotherms at Sea Level; Surface Wind Resultants, November, 1905.

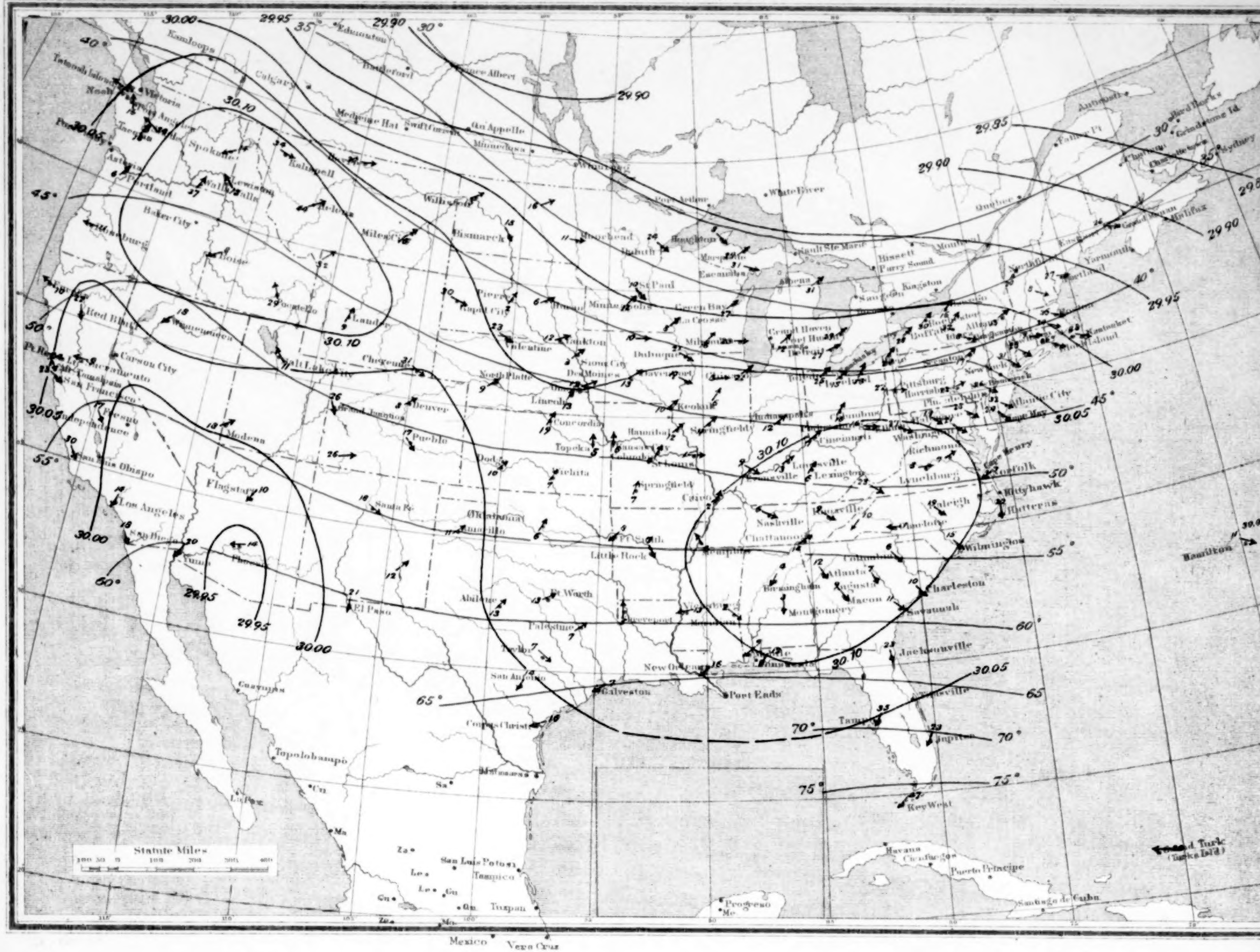

Chart IX. Sea-Level Isobars; Surface Temperatures and Wind Resultants, November, 1905.

Chart IX. Sea-Level Isobars; Surface Temperatures and Wind Resultants, November, 1905.

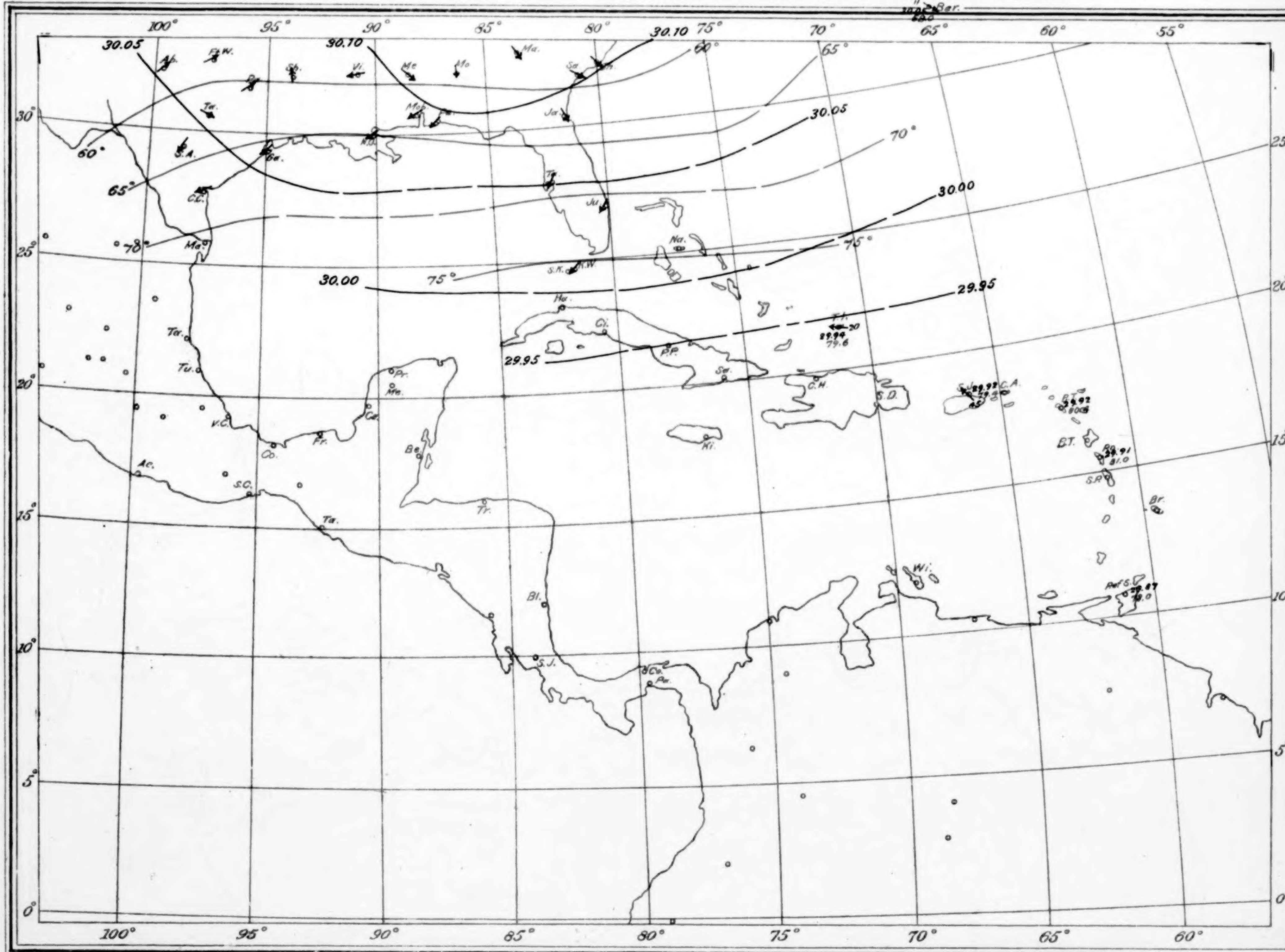

Chart X. Total Snowfall for November, 1905.

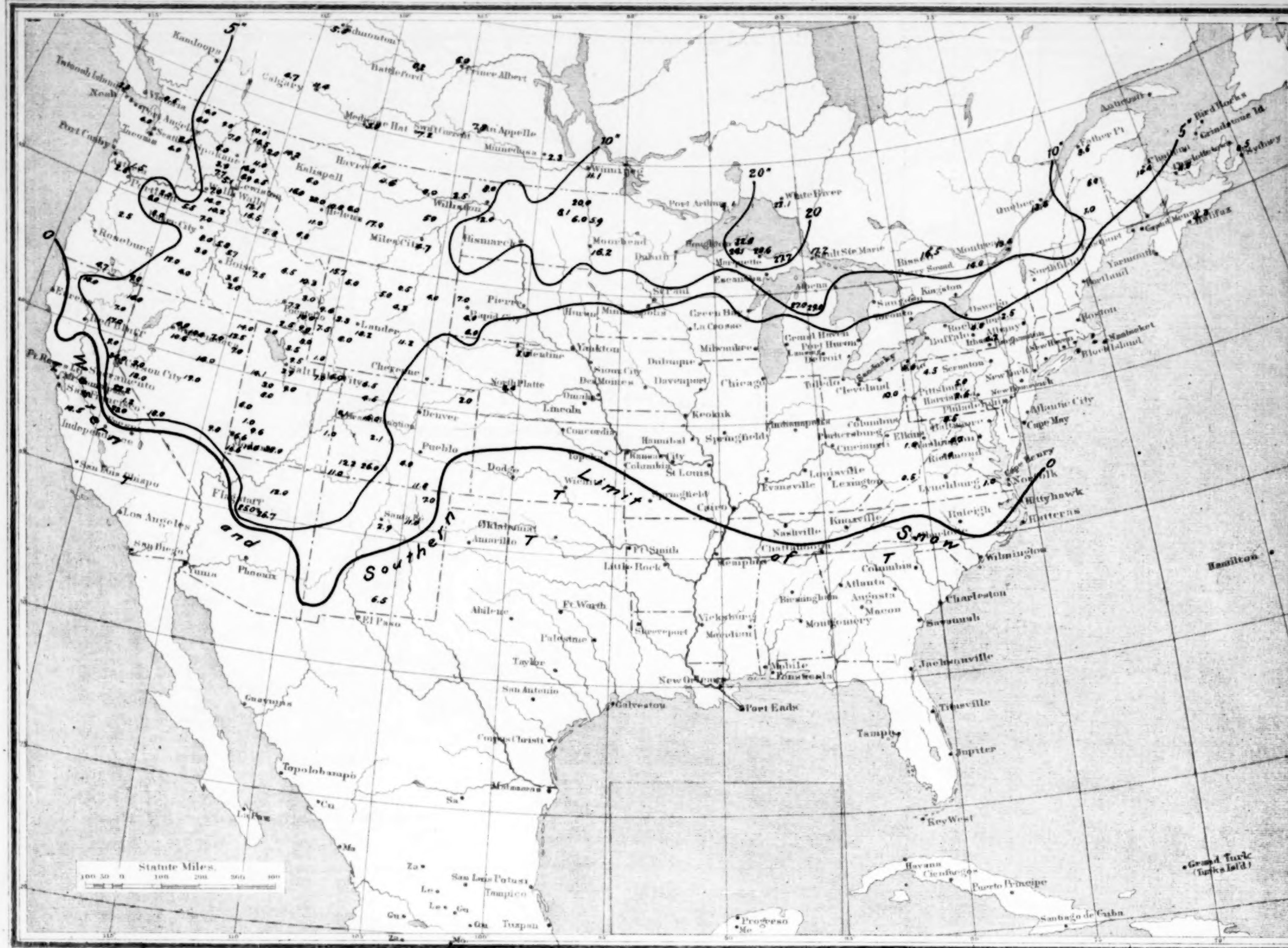

Chart XI. Depth of Snow on ground November 30, 1905.